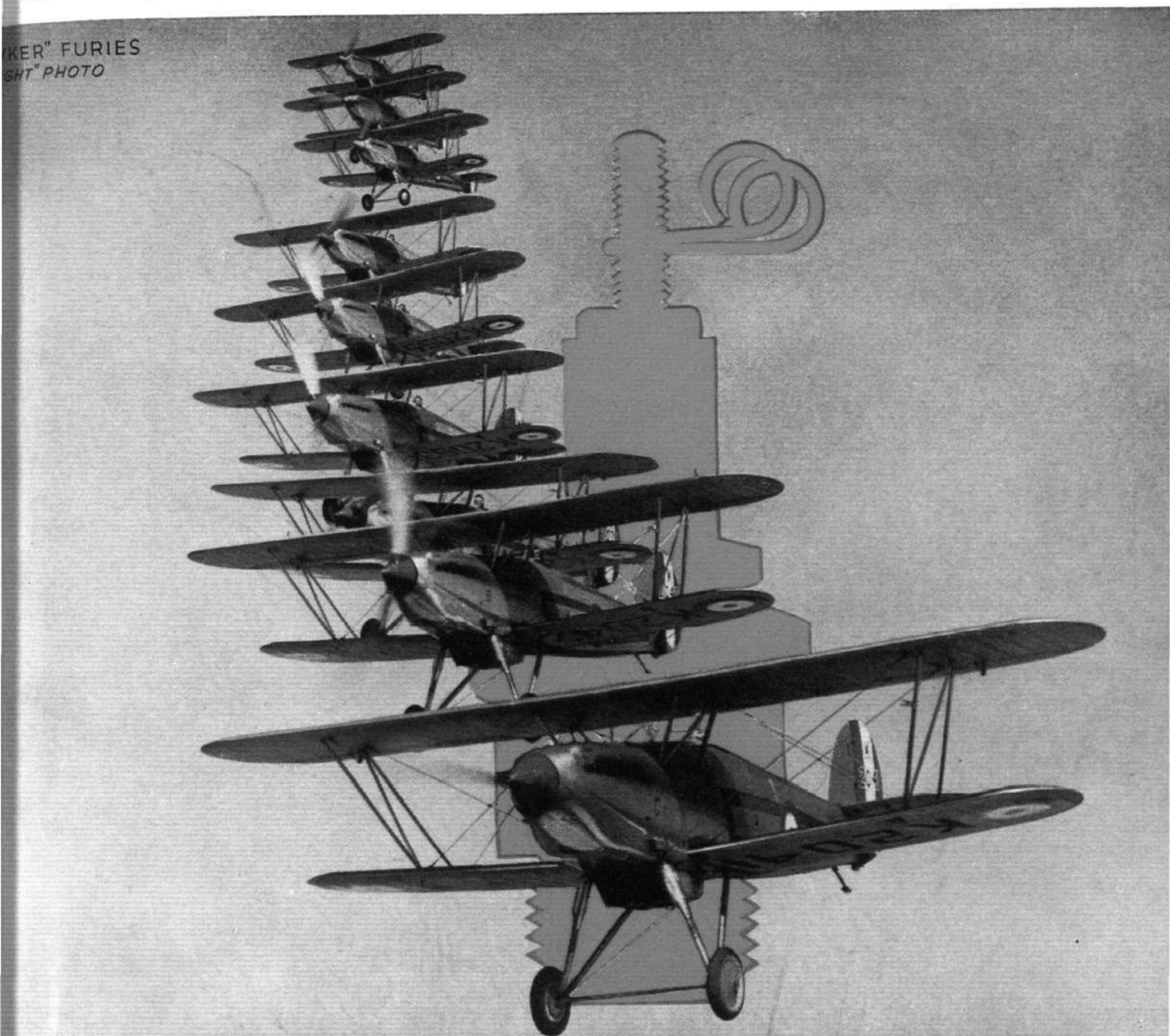
FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

No. 1380
Vol. XXVII

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

SIXPENCE
EVERY THURSDAY



KER" FURIES
GHT" PHOTO

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

Founded in 1909

FIRST AERONAUTICAL WEEKLY IN THE WORLD

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

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Safety and Reliability

"FOR multi-engined aeroplanes the performance after engine failure should be regarded as a definite problem of design." This sentence from the concluding section of Mr. Donald W. Douglas' Wilbur Wright lecture to the Royal Aeronautical Society provides ample justification for the very highly technical paper which Mr. Douglas had prepared, and which will be of very considerable value to British designers. It is not practicable to reprint the paper in *Flight*, its volume and nature being such as to preclude publication, but designers will be able to obtain copies from the Royal Aeronautical Society.

The Safest Combination

The maximum safety and reliability is reached, Mr. Douglas points out, in a four-engined aeroplane requiring but one engine to maintain a given altitude, and is followed by the three-engined machine requiring one, by the four-engined requiring two, and by the twin-engined requiring one. The first two he rules out as being practically unattainable if they are to carry any considerable payload. On the whole, he sees in the twin-engined type, of clean design and able to continue its flight at the necessary altitude on one engine, the best compromise between the several conflicting requirements.

Ability to fly at approximately zero angle of yaw requires clean aerodynamic design and vertical surface of low drag with the rudder deflected. At the same time, the rudder control must be sufficient to handle emergencies such as engine failure just after the take-off. The point is made that it is important that the wing span should be as large as possible and the offset of the airscrew from the centre line of the machine as small as possible, while the drag of the stationary airscrew should be small. This would seem to indicate the advisability of using variable-pitch airscrews in which the blades can be turned "edge-on" if an engine stops. The most important performance characteristic after engine failure is the ceiling, which must, of course, be such as to enable the aeroplane to clear all obstacles on the route. Speed is relatively unimportant from a safety point of view. There is encouragement to be found in the sentence "The design of aeroplanes for operation after engine failure is definitely a critical problem. The engineer is adequately rewarded for careful design as surely as he is penalised for merely normal design."

Mr. Douglas has succeeded in reducing to manageable proportions the many problems involved, and has introduced a rapid parameter and chart method for predicting the performance of a multi-engined aeroplane when a percentage of its engine power is lost. The method will doubtless be checked by several British designers, but in the meantime we have the distinguished American aircraft constructor's word for it that it is comparable in accuracy with flight test measurements.

The Royal Review

PEOPLE with long memories may cast their minds back to a military review before the war when the R.F.C. flew past the saluting point in their few and very primitive machines, and each machine dived in salute as it passed the King. The invention of this dive as a form of salute was commented on at the time as a very happy thought. Since then this type of Royal salute has frequently been seen at Hendon, and some years ago it was carried out by a number of squadrons in succession, but on that occasion the formation flying by some of the squadrons was rather ragged and the incident was less impressive than it might have been.

Nothing of the sort has ever been seen which will compare with the great Royal review of the Royal Air

Force to be held at Duxford on July 6, of which some further details are published in the Royal Air Force section of this issue. The muster of squadrons will be great and imposing, and we may feel sure that there will be nothing but faultless drill to be seen in the air.

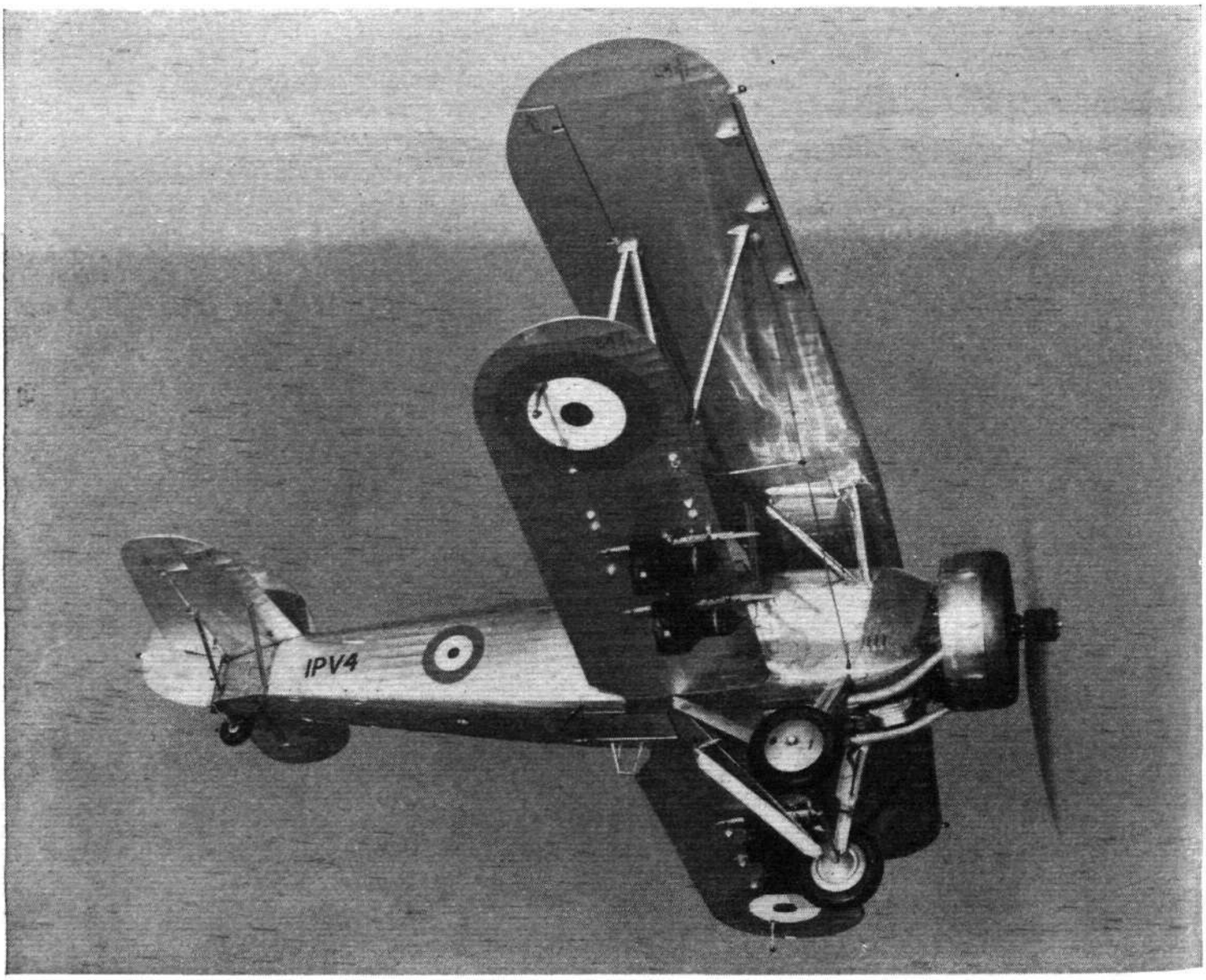
The occasion will be marked by the wearing for the first time of the uniform of a Marshal of the Royal Air Force by His Majesty the King. During the war he was once photographed wearing the khaki uniform of the new Service, but at that time there was no such rank as Marshal of the Royal Air Force.

Fully Representative

The review will be fully representative of the Command, Air Defence of Great Britain, as it exists at present, though it is now but a tiny forecast of what it will probably be two years hence. The regulars will be represented by fighters of four types and by light, medium, and heavy bombers. The Cadre squadrons will put into the air light and heavy bombers, and the Auxiliary Air Force will show fighter and light bomber squadrons. Two squadrons will represent the Army side of the Air Force, but the Coastal Area will only have one flight of various machines in the air. This will not matter so much, because the Coastal Area will doubtless be able to make its display during the Naval review, when aircraft are sure to go up from the carriers and cruisers.

Those who look at the review from the technical point of view will not feel too well pleased, for numbers of the aircraft which will take part are now obsolescent. Their speedy replacement is to be expected. On the human side there is sure to be nothing but cause for just pride. Whether the machines are old or new, the pilots can fly them with a skill not to be found elsewhere, and the aircraftsmen can keep even old machines in fine flying condition. The gathering will be a great test of organisation, and there, too, it will be very surprising if any grounds for fault-finding are discovered. The Air staffs are good, and know their business well.

Everyone, however, will be thinking of the expansion and re-equipment which lies ahead, and there a searching test of another sort of ability will be made. It must be the hope of everybody that those responsible will pass this test also with flying colours.



THE BOMB-THROWER : It is now possible to disclose the nature of this new "Pegasus"-engined Hawker machine, which was first illustrated in *Flight* last February. Although a general-purpose type, it has been specially designed for dive bombing, and for this work is claimed to be superior to any foreign design. Its designation is P.V.4, the letters, of course, signifying "private venture," i.e., not built to any particular Air Ministry specification. (*Flight* photograph.)

The Outlook

A Running Commentary on Air Topics

Booking Facilities

ON several occasions since internal air line operations were started in this country *Flight* has complained of the dearth of booking facilities. In close touch with the operators, we are naturally in a position to know how and where to book for an internal air journey, but it is difficult to see how the average layman can be anything but sublimely ignorant about the whole thing. In fact, the number of enquiries we receive proves how little the layman does know.

This, of course, is in no way the fault of the operating companies themselves. As Sir Philip Sassoon remarked in reply to a question in the House, the regular agencies are, by reason of their contracts with the railway companies, precluded from selling tickets or from giving information about independent air lines, though they are, curiously enough, allowed to book Imperial as well as Railway Air Service passengers.

Mr. McCrindle, the managing director of Hillman's Airways, in a letter to the *Daily Telegraph* last week, very reasonably complained about the position, and it is difficult to refute his claim that such penalisation is against the national interest.

Incidentally, a number of independent operators met at Heston last week with the idea of coming to an agreement on matters of general co-operation, particularly in relation to publicity, and at least one firm is interesting itself in this booking problem.

Smoke Abatement—I

ANYONE who has flown over or near such areas as that surrounding Newcastle-on-Tyne must have become, quite automatically, a supporter of the Smoke Abatement Society. Usually, in that part of the world, the towns are surmounted by an opaque pyramid of yellow smoke, and one wonders how the population manages even to survive.

From the pilot's point of view, of course, the need for smoke abatement is pressing. As Mr. Durst said at the conference dealing with smoke and aviation last week, the density of fog over land is greatly assisted by atmospheric pollution. All the industrial areas in this country suffer, too, from an almost permanent state of bad visibility caused by the actual smoke itself, and an air passenger to the North cannot fail to be impressed by the changing standards of visibility on a still summer's day. In windy conditions the smoke can be seen streaming across open country from a town or group of towns as much as fifty miles away—a depressing sight.

Certainly the problems of reliable internal air transport are tremendously increased by this nuisance. If one considers only the waste of power, it is difficult to find any reason for delaying a national campaign for smoke abatement.

Smoke Abatement—II

THE question of whether smoking by passengers should or should not be permitted by operating companies is one that is virtually settling itself, but one or two points are still worth stressing. The majority of commercial aeroplane cabins are officially passed as "fireproof," so that the problem is largely one for the operators themselves.

People are notoriously careless with cigarette ends and pipe ash. Not so long ago a member of the staff watched a man tap out his pipe in an aeroplane, and the red-hot ash would have burnt a neat hole in the floor if the careless smoker's attention had not been drawn to the matter.

The risk of actual fire, however, is negligible. The trouble is simply that vaguely nervous first passengers are made more nervous by the sight of a lighted cigarette, and passengers trembling on the unpleasant verge of air-sickness are precipitated over the edge by the sharp smell of burning tobacco. Tobacco smoke, incidentally, usually drifts forward from the cabin towards the pilot, so there is never any chance that a cigarette-hungry passenger might carry on illicitly.

All things considered, it is probably better to prohibit smoking entirely unless a separate compartment can be provided. The air passenger is normally much too interested in the things around and below him to bother very much about it.

At Last

AT last we shall be able to see a film dealing with the routine of the Royal Air Force. Rightly enough, this film, "R.A.F.," is without the usual aids to film popularity. There is no "love interest," and the subject is dealt with seriously and with real knowledge.

It is unfortunate that such a film cannot be treated as a box-office attraction, and is, therefore, of comparatively short duration, but the photography is nothing less than superb. The shots of No. 25 Squadron's "Furies" are, in particular, of outstanding merit, and it is probable that very few filmgoers will have seen machines, actually flying, from such close quarters.

Certainly, the formations were absolutely perfect, and the photographic machine was placed in every possible position. In two cases this machine actually passes along the line of "Furies" while these are being flown in "echelon" and in "line abreast." Even the sound effects while the pilots of a flight juggle with the throttles of their "Kestrels" are above reproach, though one might suggest that it would have been better if sound effects had replaced some of the incidental music, however apt this may be.

Air, Land and Sea

ALTHOUGH it would be possible to write almost indefinitely about the flying shots, "R.A.F." deals with the ground training of both cadets and aircraftmen and with the work of both flying-boat and Fleet Air Arm units.

The section in which H.M.S. *Furious* appears is particularly fine, and for about half a minute it is possible to watch "Bulldogs" toying with the idea of attacking a flight of "Southamptons." In this issue of *Flight* the affiliation between 'Bulldog" and 'Southampton' squadrons is, by a coincidence, described.

Finally the work of the Royal Air Force as a guardian in desert operations is also dealt with in the film which was shown at a Press view at the Curzon Cinema, Mayfair, last Tuesday. "R.A.F." will open at the Polytechnic Theatre, Regent Street, London on June 17.

Technically excellent, as many of the American service-flying films are, this British counterblast was more than overdue.

"AT HO

Many Private O

THE whole aviation world and his wife seemed to be at Brooklands last Saturday afternoon, when the Brooklands Aero Club held its annual "at home," Vickers and Hawkers co-operating. It was just what such an affair should be—garden-partyish, but not too much so; an opportunity of meeting old friends, with some good flying to watch while one chatted.

By the time the fun began at 3 p.m. there were some forty-five visiting aircraft parked along the south side of the aerodrome, and others continued to arrive at intervals throughout the afternoon, among them Mrs. Mollison's gaily-painted Beechcraft, Mr. Kronfeld's little "Drone," and several Service machines, including a "Lynx" Avro painted the official Goldflake yellow which, leper like, warns other folk that the driver is probably under instruction.

The Cinque Ports Club (which, of course, is associated with Brooklands) had sent up quite a formation from Lympne, but the Sywell contingent—and Mr. Thorn, who was to have demonstrated the Avro machines—were held up by "clouds on the tree-tops."

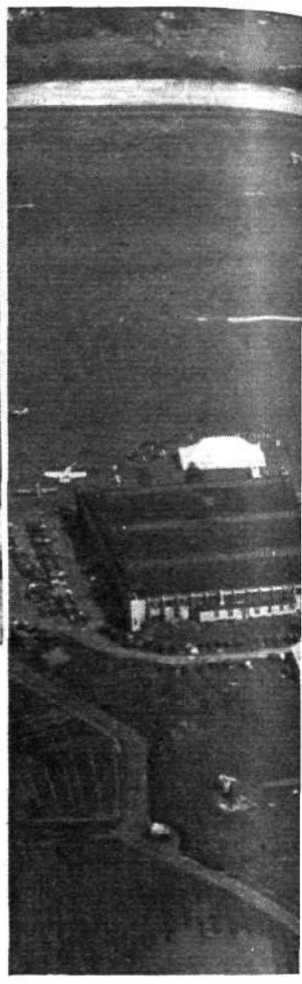
Among the visitors was Lord Londonderry, who flew over in his "Cadet" from Hendon.

Mr. George Lowdell, erstwhile Brooklands instructor, and now Wolseley test pilot, opened the flying programme with a display on the Hawker "Tomtit," which is an experimental training biplane designed some little time back and fitted with a Wolseley A.R.9 engine; actually, it is used by the Wolseley folk as a sort of flying test bench, and, judging by Mr. Lowdell's exhibition of its manœuvrability, it is a bench without a single vice.

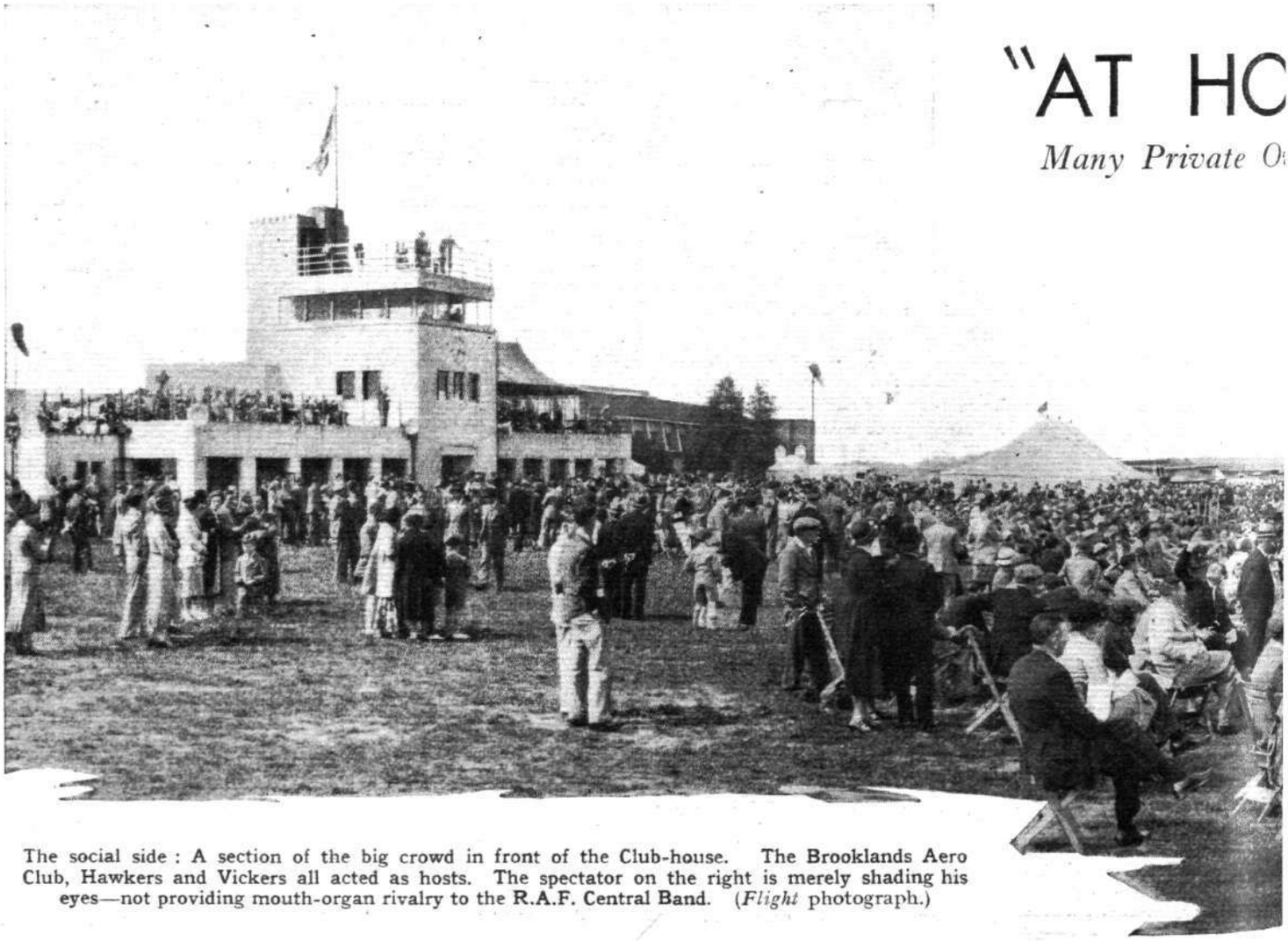
Item two was the latest Short "Scion" in the hands of Mr. Mark Lacayo, of Heston Sales. Everybody was impressed with this distinctive little five-seater's gentlemanly progression—even at the maximum speed of 128 m.p.h. the two 90 h.p. Pobjoy "Niagaras" emit only a smooth purr suggestive of a brace of small sports cars.

Mr. E. W. Percival gave an aerobatic display with the Percival "Gull" which showed off the lively performance of

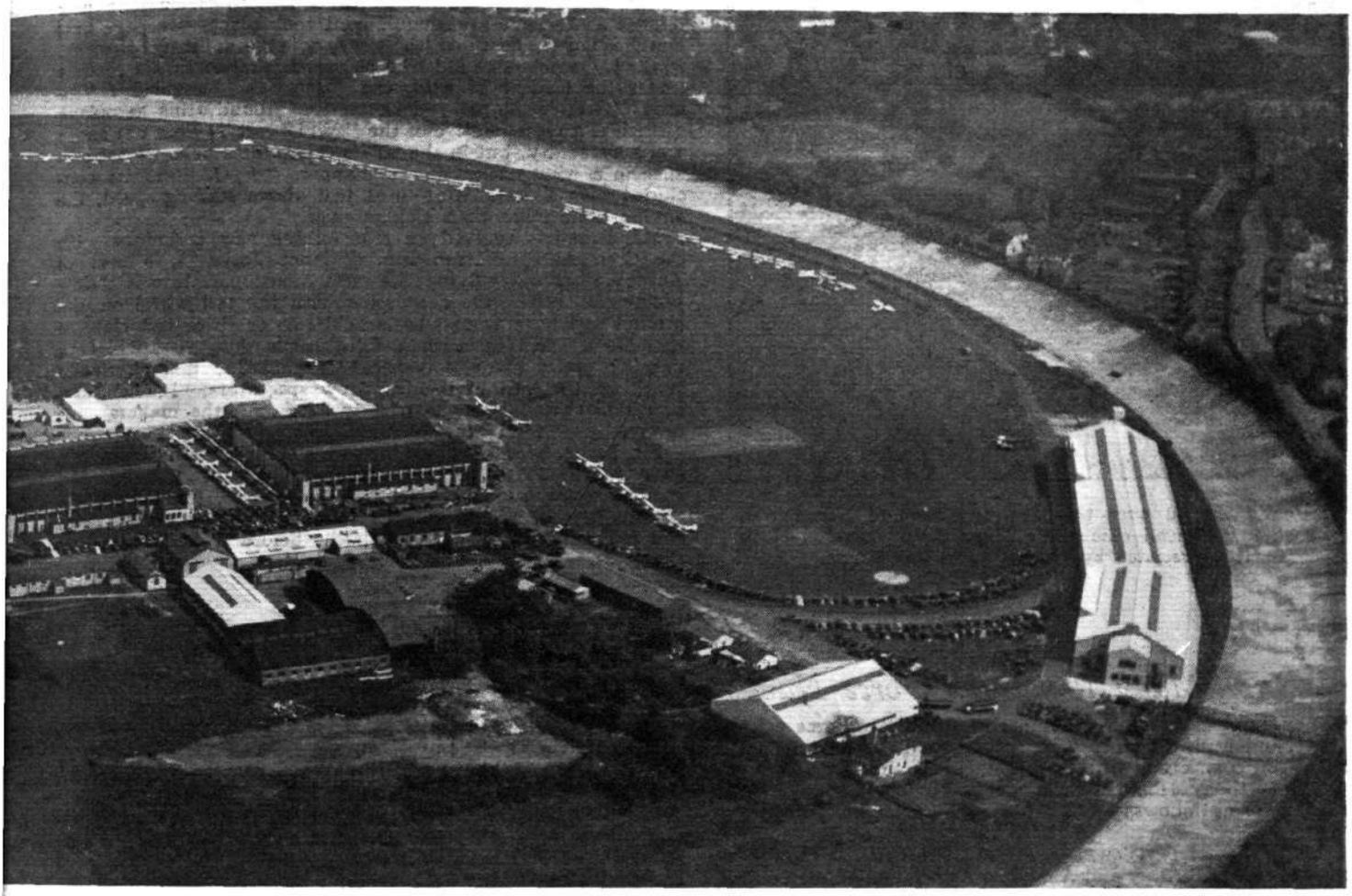
Masters of ceremonies: Mr. J. J. Jeffs and Capt. Duncan Davis (with Aldis lamp) on the control-tower roof. (*Flight* photograph.)



(Right) This aerial view shows the parked visiting machines, which ranged from a power-driven glider to Service light bombers. (*Flight* photograph.)



The social side: A section of the big crowd in front of the Club-house. The Brooklands Aero Club, Hawkers and Vickers all acted as hosts. The spectator on the right is merely shading his eyes—not providing mouth-organ rivalry to the R.A.F. Central Band. (*Flight* photograph.)



at BROOKLANDS

Other Enthusiasts Visit the Aerodrome for Club Display of the Season

Lord Londonderry, Secretary of State for Air, was among the visitors; he arrived in an Avro "Cadet." (*Flight* photograph.)

that 170 m.p.h. three-seater cabin monoplane to the best advantage.

Avros grave and gay next took the stage—a "Commodore" (215 h.p. "Lynx") and a "Cadet" (135 h.p. "Genet Major"). The "Commodore," of course, is the British reply to the popular American private-owner or "business-man" type, and carries pilot and three passengers at 125 m.p.h. in a cabin that simulates a comfortable saloon car down to the smallest chromium-plated details. There is sound psychological sense in designing aircraft interiors on these lines—a lot more people would fly if the insides of aeroplanes didn't look so much like the insides of aeroplanes. The "Cadet" in its various manifestations everybody knows.

The British Aircraft Manufacturing Company's products, the "Eagle" (130 h.p. "Gipsy Major") and the "Swallow" (80/90 h.p. Pobjoy "Cataract II") displayed their characteristics in the respective hands of Flt. Lt. J. B. Wilson and Mr. Bay. The "Eagle," with its striking dark and light blue finish and revokable wheelwork, gave a spectacular show, and Mr. Bay, after demonstrating the 112 m.p.h. maximum of the "Swallow," just to show there was no deception, proceeded to float about the sky at 25-30 m.p.h., alternately stopping and starting his motor from the cockpit and eventually making a dead-stick landing. And the "Swallow," to quote the words of an aeronautical announcer on another auspicious occasion, has neither slops nor flats.

Speedy Commercial Types

Flt. Lt. Colman, with the Airspeed "Envoy" (two "Lynx IVC") showed the uninitiated the means by which passengers on an increasing number of internal air lines are conjured swiftly from A to B, and Mr. Seth Smith displayed the paces of another speedy two-engined low-wing passenger monoplane, the S.T.10 (two 90 h.p. Pobjoy "Niagaras"); the machine was G-ACTS, the winner of last year's King's Cup, and Mr. Smith flew her variously on two engines, one engine, and practically no engine at all.

The why and wherefore of flaps, with especial reference to landing, was expounded most impressively by Flt. Lt. "Tommy" Rose with a Miles "Falcon," and Flt. Lt. Milne, flying the "Hawk Major" showed that this machine is quite happy in inverted and other unorthodox attitudes.

After an interval for a very excellent tea party in the big

Recently erected over the information board outside the Brooklands control office, this *Flight* mains-operated clock is appreciated by visiting pilots and others.

school hangar (and during which a demonstration of a new midget short-wave radio equipment took place—see page 615) warlike noises heralded the entry of the military element, F/O. J. Summers thundering skyward perched in his cockpit under the leading edge of the "Pegasus" engined "Vincent" G.P. machine. Seen on the ground, this aeroplane (which is a close relative of the "Vildebeest") does not shout manœuvrability, but in the air its capabilities belie its appearance in a most extraordinary manner. F/O. Summers concluded with a demonstration at just above stalling speed, the engine little more than ticking over.

Mr. Brie has evolved an entertaining new technique with the C.30 Autogiro (140 h.p. "Genet Major"), a sort of Autogyratory crazy-flying; its most amusing feature is a slow progression across the aerodrome with the tail wheel on the ground and both front wheels held two or three feet clear of it. He finished up with a full-throttle demonstration (112 m.p.h.), then made a vertical landing in, metaphorically speaking, the laps of the front-row spectators. Incidentally, it is said that during the past twelvemonth the makers have received orders for ninety-three C.30's.

Flt. Lt. P. W. S. Bulman took up a "Hart" and, of course, gave *the* aerobatic demonstration of the day. Finally, Mr. B. de Greeuw, armed with a G.Q. parachute, jumped from a "Moth," touching down very neatly, finishing on his feet, and gathering-in his canopy almost before it had floated to the grass.

BIRTHDAY HONOURS

Many Royal Air Force Names in Lists of Honours and Awards

THE names of a large number of Royal Air Force officers and men, together with several civilians holding posts in connection with aviation, figure in His Majesty's Birthday Honours lists announced last Monday. The names are as follows:—

HONOURS

K.C.B. (Civil Division): C. F. De Salis, C.B., D.L., Chairman, Territorial Army and Air Force Association of the County of Middlesex.

G.C.B. (Military Division): Air Chief Marshal Sir E. L. Ellington, K.C.B., C.M.G., C.B.E.

K.C.B. (Military Division): Air Marshal A. M. Longmore, C.B., D.S.O., Royal Air Force; A.V.-M. C. L. N. Newell, C.B., C.M.G., C.B.E., A.M.

K.C.B. (Civil Division): G. C. Simpson, C.B., C.B.E., LL.D., D.Sc., F.R.S., Director of the Meteorological Office.

C.B. (Military Division): A.V.-M. F. W. Bowhill, C.M.G., D.S.O.; A.V.-M. N. D. K. MacEwen, C.M.G., D.S.O.; Air Comdre. E. D. M. Robertson, D.F.C.

C.B. (Civil Division): H. E. Wimperis, C.B.E., M.A., F.R.Ae.S., M.I.E.E., Director of Scientific Research, Air Ministry.

K.C.M.G. (Order of St. Michael and St. George): A.V.-M. Sir P. W. Game, G.B.E., K.C.B., D.S.O., lately Governor of the State of New South Wales.

C.B. (Order of the Bath, Military Division): A.V.-M. R. Williams, C.B.E., D.S.O., Chief of the Air Staff, Commonwealth of Australia.

O.B.E. (Military Division): Wing Cdr. W. D. Bostock, R.A.A.F.; Sqn. Ldr. G. E. Brookes, R.C.A.F.; Sqn. Ldr. H. C. Harrison, R.C.A.F.; Wing Cdr. C. L. Archbold, R.A.F.; Wing Cdr. J. K. Wells, A.F.C., R.A.F.; Wing Cdr. C. R. Cox, A.F.C., R.A.F.; Wing Cdr. J. J. Breen, R.A.F.; Wing Cdr. F. G. Sheriff, M.C., R.A.F.; Wing Cdr. T. C. St. Clessie Morton, M.D., Ch.B., M.R.C.P., D.P.H., D.P.M., D.T.M. and H., R.A.F.; Sqn. Ldr. J. Whitford, R.A.F.; Sqn. Ldr. F. F. Garraway, R.A.F.

O.B.E. (Civil Division): F. P. Raynham, Director of the Air Survey Co., Ltd., Indian Air Survey and Transport, Ltd., Indian National Airways, Ltd.; W. W. Burkett, M.C., Assistant Director, Air Ministry.

M.B.E. (Military Division): Capt. E. Boggis, 26th (London) Company, Air Defence Brigade Signals, T.A.; Capt. A. J. De Pury, 1st Anti-Aircraft Searchlight Battalion, Royal Engineers; Company Sergt.-Major A. E. Mansell, A.A. Searchlight Companies, T.A.; Capt. J. D. Tritton, Adjutant, Essex Group A.A. Searchlight Companies, T.A.; Flt. Lt. (Acting Sqn. Ldr.) H. N. Thornton, R.A.F.; Flt. Lt. F. G. Brockman, R.A.F.; Flt. Lt. L. K. Barnes, R.A.F.; Flt. Lt. J. J. Ironmonger, R.A.F.; W/O. P. Hall, W/O. J. E. Watson, W/O. J. O. Annan, W/O. S. Stubbs, all R.A.F.

K.B.E. (Military Division).—A.V.-M. J. McIntyre, C.B., M.C., M.B., B.Ch., R.A.F. (Retd.).

C.B.E. (Military Division): Group Capt. C. G. Smith, O.B.E.; Group Capt. H. J. Down; Matron-in-Chief Miss K. C. Watt, R.R.C., Princess Mary's Royal Air Force Nursing Service.

C.B.E. (Civil Division): G. E. Woods Humphery, O.B.E., Managing Director, Imperial Airways; L. G. S. Reynolds, O.B.E., Assistant Secretary, Air Ministry.

AWARDS

The Air Force Cross: Sqn. Ldr. R. Harrison, D.F.C.; Sqn. Ldr. T. C. Luke, M.C.; Sqn. Ldr. E. F. Waring, Flt. Ltd. J. A. T. Ryde, Flt. Lt. J. G. Elton.

The Air Force Medal: Sergt. F. Landrey; Sergt. H. G. Dingwall (attached Egyptian Army Air Force).

Royal Red Cross (Second Class): Senior Sister N. G. Rees, Sister (Acting Senior Sister) C. Walker, Sister M. G. Wiseman, Princess Mary's Royal Air Force Nursing Service.

British Empire Medal: Sergt. F. J. Poulter, Cpl. J. L. Thrussell, L.A/C. K. A. Bennett, Royal Air Force.

M.B.E.: Flt. Lt. M. W. Buckley, R.N.Z.A.F.; Warrant Officer Class 1 A. A. Rabnett, R.C.A.F.

R.A.F. Casualties in Quetta Earthquake

Flight greatly regrets to record the death, in the earthquake which took place at Quetta, India, last Friday, of a Royal Air Force Officer and a number of airmen. The squadrons at Quetta Aerodrome, where the casualties occurred, are Nos. 5 and 31 (Army Co-operation), equipped with "Wapitis."

His Majesty the King has sent a message to the Secretary of State for Air expressing his deep sympathy. Lord Londonderry and Sir Edward Ellington (Chief of Air Staff) have sent personal messages of sympathy to the A.O.C., Royal Air Force, India.

The Air Ministry last week-end issued the following revised casualty list:—

No. 5 Squadron: Killed.—Pilot Officer C. R. Paylor, Corporal H. R. Cope, L.A.C. D. S. Fleisig, Corporal G. Brunsdon, AC. 1 A. W. F. Craig, AC. 2 L. Carter, Corporal D. F. Henderson, AC. 1 J. Lunt, AC. 1 C. W. S. Neeve, Corporal J. G. Parry, AC. 2 H. Percival, L.A.C. T. V. Wilson, Corporal W. H. Wilton, AC 1 J. P. Trainor, L.A.C. N. Gelder, L.A.C. O. E. Jones, L.A.C. R. J. Miller, L.A.C. J. Pendlebury, AC. 1 J. C. Ratcliffe, Flt. Sergt. C. E. S. Taylor, L.A.C. G. J. Harman.

No. 31 Squadron: Killed.—L.A.C. J. A. Arthur, A.C.1. F. J. Bailey, L.A.C. M. A. T. Bond, L.A.C. A. G. Cronk, A.C.1. R. A. Curtis, Corporal G. E. Easton, L.A.C. S. W. Evans, Sergeant D. N. Fincham, Sergeant H. Grant, Corporal H. R. C. Herring, A.C.1. W. McGill, L.A.C. B. Nickalls, L.A.C. T. C. Penwarden, Corporal C. B. Seymour, A.C.1. R. A. Verey, A.C.1. J. R. Claydon, Corporal H. G. Knowlton, L.A.C. G. D. Scrafton, A.C.1. T. C. Somerford, L.A.C. T. F. Smith.

Aircraft Depot, attached No. 3 Wing: Killed.—Corporal T. W. Livermore.

No. 3 Wing: Killed.—Sergeant A. Ayling, Corporal R. C. Cousins, L.A.C. A. O. Smith, A.C. 1 A. H. C. Chitty, L.A.C. R. Higgins, A.C. 1 F. R. Adey.

Missing.—Corporal F. E. Hall.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Eager

It is stated that after announcement of R.A.F. personnel requirements the Air Ministry received no fewer than 29,000 enquiries in four days; 9,000 were for employment as officers or airmen pilots.

The Macon Crash

A report issued by the U.S. Navy Department declares that the Department is unable to determine whether a gust of wind or a structural defect caused the loss of the dirigible *Macon* which fell into the Pacific in February.

British Aircraft for Sweden

The Swedish Government has ordered two Handley Page bombers, and on the satisfactory completion of tests it is likely that more of the type will be constructed under licence in Sweden.

A Transatlantic Hitch

The maiden voyage of the giant Latecoère flying boat *Lieutenant de Vaisseau Paris*, which was to have been made last week, has been postponed owing to an outbreak of fire.

Cutting the Cost

The Fahlin monoplane, which, as already recorded in *Flight*, is the subject of a contract from the U.S. Bureau of Air Commerce, uses a converted 90 h.p. six-cylinder Plymouth car engine which gives the machine a top speed of 120 m.p.h.

Home from Antarctica

The Curtis-Wright "Condor" (715 h.p. "Cyclone") used by Admiral Byrd on his second Antarctic Expedition is now on its way home to Boston by ship. Fitted alternately with floats and skis, it flew 30,000 miles during the expedition, over 250,000 square miles being explored and/or surveyed.

SERVICE MODES. A group of pilots caught by a *Flight* camera during a rehearsal at Upper Heyford last Friday for the special formation-flying item at the forthcoming Hendon Display. The squadrons concerned are Nos. 15, 18 and 57, and the machines are "Harts." Service flying kit of to-day makes an interesting contrast to the well-remembered fashions of 1916-18.

Twenty-five Years Ago

From "Flight" of June 4, 1910

"Shortly after 8, however, Mr. Grahame-White started again, and flew for a quarter of an hour over Putney and Barnes Common at a height of about 600ft. Arrangements were made to take a number of people for five-minute trips at £10 10s. each.

SANS QUEUE. The latest French contribution to the "flying flatfish" cult, M. Fauvel's machine has a 75 h.p. Pobjoy engine, giving a top speed of 115 m.p.h.

High Bidding?

What is said to be the first aerial bridge drive took place last Sunday in a K.L.M. Fokker F36 over Schipol Aerodrome, Amsterdam. Thirty-two of Holland's foremost bridge experts took off at 3.30 p.m. and landed at 5 p.m.

On the Spot

Autogiros carrying mails landed on and took off from the roof of the Philadelphia Post Office last week. The roof measures less than 400 ft. by 275 ft. A regular service is to be flown between this post office and Camden (N.J.) Airport.

Death of a Parachutist

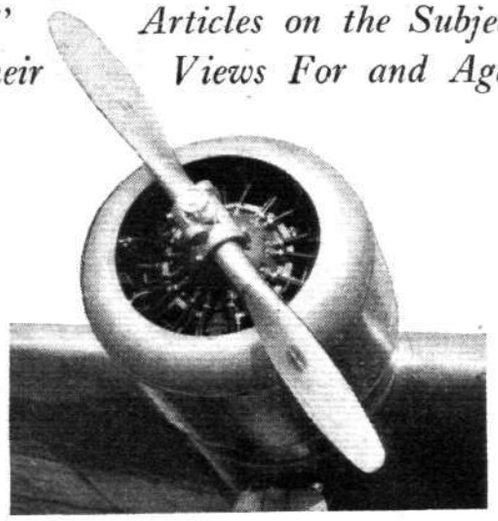
Flight regrets to record the death of Mr. Ivor Price, a parachutist with Sir Alan Cobham's Display. He was making a drop at Woodford, Cheshire, last Thursday, and his parachute, for some reason unexplained, did not open. Mr. Price had made many hundred descents, and at Cardiff last September made eight jumps in 16 min. 50 sec.

Air Day Attendances

The Air League has announced that 60,000 people attended the civil aerodromes open to the public on Empire Air Day. This figure included 9,139 who visited the Rolls-Royce works at Derby. The combined total of paid attendances at R.A.F. and civil aerodromes was 200,000, and the Air League states that the R.A.F. Benevolent Fund will benefit to the extent of not less than £4,000.

JUSTIFYING the C.P. AIRSCREW

Following "Flight's" Articles on the Subject, Eminent Designers Give Their Views For and Against



WHEN is a controllable-pitch airscrew worth while? The question cannot be answered briefly; too many factors enter into the argument. One might come fairly close to the truth by replying that the controllable-pitch airscrew becomes desirable in an aircraft the fixed blades of which would be stalled during the early stages of the take-off. It may be remembered that in *Flight* of May 2 and 9 were published articles describing some of the most successful controllable-pitch airscrews, and in *Flight* of May 16 there appeared a leading article under the heading, "Controllable Pitch or ———?" In the leader it was pointed out that not every aircraft engineer is convinced that the controllable-pitch airscrew is worth adopting, and that some hold that a two-speed airscrew reduction gear and/or increased ground boost of engines afford simpler and lighter solutions. We invited readers to contribute their own views, and below will be found letters from a large number of the chief designers of the British aircraft industry. It will be seen that the need for the C.P. airscrew is fairly generally realised and admitted, but that there is some divergence of opinion as to when it is worth while. The correspondence is not of a highly technical nature, and most readers will be able to follow the arguments set forth.

As the De Havilland Company has acquired the manufacturing rights of the Hamilton controllable-pitch airscrew in this country, particular interest attaches to the opinions of Mr. C. C Walker, a director of the company and Chief Engineer. He writes:—

"In the May 16 issue of *Flight* you ask for the views of readers on the relative merits of controllable pitch, ground-boost for take-off, and the two-speed gear.

"Confining attention to propellers of large P/D ratio as being those in need of some device, it may be stated generally that the loss in thrust arising from too large an angle of attack during take-off is more serious than the loss of power due to the r.p.m. being held down.

"If an engine is boosted to increase the r.p.m. and power during take-off the loss of thrust due to the angle of attack being too great will be still further accentuated and will be a serious deduction from the increased power available.

"In the controllable-pitch propeller there is a gain of both power and efficiency since the angle of attack is reduced until full power is developed.

Wasteful Methods

"But apart from this the scheme is not a sound one (so long as C.P. propellers are obtainable) from many points of view. For example, it would be quite impossible in many cases to get anything like enough power from boosting to turn the propeller at maximum r.p.m. during take-off.

"In the case of a fast commercial aeroplane the power would have to be multiplied extravagantly to get the maximum r.p.m., and the increased nett thrust would then be only quite small. Furthermore, it would be wasteful to make an engine which only used a very small fraction of its full power when cruising. From 60 per cent. to 75 per cent. of the maximum power used for take-off can be used for cruising with sufficient reliability. It stands to reason that engines will be boosted for take-off to what they will reliably stand, say, to 1.4 times the cruising power, but to make reasonable use of this, controllable or variable pitch is necessary.

"The two-speed gear would enable the full take-off power of the engine to be developed, but since the propeller must also increase its r.p.m. (to absorb the increased power due to the gear permitting maximum engine r.p.m.) the angle of attack will be greater and the loss of thrust on this account—already serious—will be aggravated. The nett gain, therefore, will be much smaller than with controllable pitch, where not only is full power developed but angles of attack are reduced to turn the power to better account.

"So far, only take-off considerations have been dealt with. It does not even now seem to be generally realised that controllable pitch enables cruising speeds at heights to be increased in some cases by over 20 m.p.h. It does this by permitting the full cruising power to be taken from the engine without exceeding the cruising r.p.m. Neither of the other devices does this."

Maj. F. A. Bumpus, Chief Designer to the Blackburn Company, feels that the answer to our question "Controllable Pitch or —?" is wrapped up in the specification.

"There is no doubt (he writes) that for some classes of aircraft the controllable pitch airscrew is an essential ingredient of a modern design, but there are other specifications, chiefly in the military field, where the enormous increase in power which the engine makers have recently given us for take-off reduces the possible benefit of a controllable-pitch airscrew almost to vanishing point. In such cases there appears little justification for the extra weight and cost of the variable-pitch airscrew, particularly when it is remembered that, in order to balance the extra weight on the nose of the aircraft, load has to be placed farther aft and moments of inertia go up very considerably. This is, of course, an important consideration in machines where manœuvrability is an important factor.

"I think the fact that various firms tend to specialise on different classes of aircraft goes to explain the reason why some engineers regard the controllable-pitch airscrew as the only solution, whereas others are sceptical as to its importance.

"We have, of course, also to remember that the different system of rating engines in this country and in America makes a very big difference to the application of the C.P. airscrew."

In a Nutshell

Mr. J. D. North, Joint Managing Director and Chief Engineer of Boulton Paul Aircraft, writes:—

"As I understand the problem, the controllable-pitch airscrew does two things: (1) By reducing the torque coefficient it enables the engine to be run at higher speed, and consequently it will give more power. (2) By reducing the pitch the thrust coefficient at low speeds is increased and the extra power is more usefully applied.

"The two-speed reduction gear or special ground-boosting may do the first, but it cannot do the second unless some type of airscrew can be produced in which the blade will not stall at big angles. The problem of the controllable-pitch airscrew does not seem to be the controlling mechanism, but the blades."

Chief Designer to A. V. Roe and Co., Ltd., Mr. R. Chadwick writes as follows:—

"I have read your article on controllable-pitch airscrews with interest, and in my opinion we will certainly have to use this type of airscrew in the future. As a matter of fact, I have been trying for some time to obtain C.P. screws.

"On the other hand, as you are no doubt aware, the Armstrong Siddeley Company has been experimenting for a long time with two-speed airscrew drives, and for certain conditions these are a considerable help. It is pretty obvious, however, that the controllable-pitch airscrew is the best proposition on a machine with a very wide speed range, particularly for take-off.

"I have been more concerned with the twin-engined machine, and I think that it is on this type that the controllable-pitch airscrew is of the greatest value, as it makes such

a big difference when one engine is out of action. The big snag about the controllable-pitch airscrew at the present time is its enormous cost and very considerable weight.

"Another trouble has been that we in England could not obtain these airscrews suitable for English engines, and finally, English engines had not been type-tested to the special conditions which are required when using a variable-pitch propeller.

"All these points, however, are now being dealt with, and I am sure that in the near future there will be a considerable number of variable-pitch propellers in use."

Investigations regarding controllable-pitch airscrews in connection with a fast four-engined flying-boat are being carried out by Mr. H. Knowles, Chief Designer to Saunders-Roe, Ltd., with a view to ascertaining the best arrangement of the alternatives of (a) a two-pitch propeller, (b) an infinitely variable-pitch propeller, (c) a fixed-pitch propeller with geared engine, (d) an infinitely variable-pitch propeller with geared engine, (e) a fixed propeller with extra boost.

"It is pretty definite (he writes) that a two-pitch propeller is of insufficient value for a medium-speed flying boat, owing to the large increase in weight, with but little gain at take-off over the increased power we are already permitted to use with medium-supercharged engines by going through the boost to maximum power.

"With regard to the weight question, I already find that two-pitch, three-blade Hamilton airscrews, when fitted to the above-mentioned fast four-engined flying boat, are equivalent to the weight of an extra engine, but, of course, without mounting and installation. This is rather a high price to pay for improvement in thrust at take-off speed only."

Insufficient Blade-angle Range

Mr. R. K. Pierson, Chief Designer to Vickers, Ltd., gives his opinion as follows:—

"I have read your articles on the controllable-pitch airscrew with great interest, and would state at the outset that were it not for the controllable-pitch airscrew several of the designs for machines now building could not be brought to fruition in their present form.

"Hitherto the wing loading has been fixed by consideration of landing speed, and with the wing areas then necessary the take-off presented few difficulties, but the advent of supercharged engines, together with the adoption of wing flaps and the facilities they give for using high wing-loadings have made the problem of getting off of paramount importance.

"Considering the various means at our disposal for overcoming these difficulties; we have had the two-speed gear, and I think it has been shown that this by itself is not of sufficient benefit to justify its general use. By choosing the second gear ratio to give the maximum revs for take-off the engine has to be throttled or the gear changed during the initial climb, or one can choose the second gear to give maximum revs on the initial climb, in which case the take-off suffers, so whatever way one looks at it the two-speed gear can only give a partial gain in performance. In addition, it is of no value whatever in reducing the drag of a stopped airscrew on a multi-engined machine.

"Now we have the controllable-pitch airscrew in its two forms, two-pitch and infinitely variable. Taking the two-pitch type first as being the one generally available in this country, we find that we are limited to a definite range of blade movement, at present 8-10 degrees. Calculations show that with this limitation of blade movement the full benefit can only be obtained on certain engines where the ratio of ground level power to full supercharged power is such that the fine-pitch setting gives maximum revs at the ground and the coarse-pitch setting gives maximum revs at the full supercharged height. On quite a number of engines this power ratio is not satisfied, and especially in the case of a high-speed machine greater range of blade movement is highly desirable.

"The full benefit of this type of airscrew is, generally, only to be obtained on a type of engine which I do not think you mentioned, i.e., the two-speed-blower engine. Therefore, although this type of airscrew goes some way towards a solution of our troubles it does not give all that is desired on all engines, and, furthermore, does not help in the dead airscrew problem.

"The ideal would seem to be the infinitely variable airscrew, for it possesses the adaptability which enables the best to be made of the power available, whether it is taking-off, climbing or cruising, and, in addition, enables the dead airscrew to be set at a position of minimum drag, which may make all the difference to flight on one engine in a heavily loaded machine.

"On the question of whether it would pay to put the extra weight of controllable-pitch airscrews into the engine in exchange for more power, it seems to me the doubt would not arise if the following points are considered:—

(*a*) The aircraft designer has to take the engines that are available and get the best out of them; they are not units that can be expanded by the addition of extra cylinders.

(*b*) That it is the t.h.p. power-unit weight and not b.h.p. power-unit weight that really matters.

(*c*) Whatever power the engine is made by the addition of extra weight, just that bit extra can be got out of it by fitting controllable-pitch airscrews, the weight of which will more than pay for themselves.

"Summing up, I should say that the solution of the problem, as I see it, is infinitely controllable-pitch airscrews fitted to two-speed-blower engines."

Advantages Outweigh Disadvantages

Then we have the opinion of Mr. A. Davenport, Chief Designer to the Westland Aircraft Works. He says:—

"We have been, and are, actually interested in the solution of this matter, and after a thorough investigation have come to the definite conclusion that, in spite of the very heavy additional weight entailed and the tremendous extra cost over the fixed-pitch airscrews, the advantages are such that it will be necessary on most aircraft to use a controllable-pitch airscrew where very high performance with good take-off qualities are necessary.

"The alternative of a two-speed reduction gear is, I consider, only a partial solution. It certainly enables more power to be obtained from the engine by the increased revs, but the airscrew for take-off is still starting in a stalled condition, and it is some time before respectable efficiency is obtained.

"This effect will be much more emphasised on the new machines coming through where the pitch of the blades is much greater, due to the higher top speed of the aircraft. In addition to this, in my opinion, a two-speed reduction gear is of little use unless it is used with a two-stage blower. This, I think, is apparent, otherwise the ground-boosting obtained at full throttle, even with doped fuels, would be too much for a fully supercharged engine, and therefore throttling would have to be resorted to."

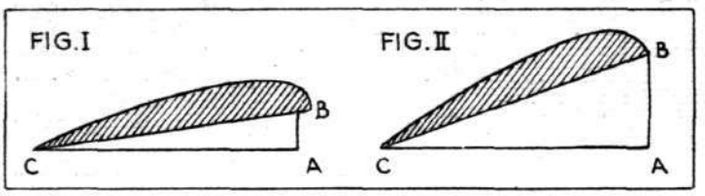
"The Logical Solution"

Dr. H. C. Watts, technical director of the Airscrew Co., Ltd., offers an interesting summary.

"I have read with interest your article on 'Controllable Pitch or ———?' and I feel quite sure that the controllable-pitch propeller is the logical solution. I know that many must be puzzled at the apparent inconsistency between the obvious scepticism of experts in the past concerning the possible value of variable-pitch propellers and the actual demonstrated achievements to-day. There is no real inconsistency. What the "experts" said in the past was correct at the time when they spoke. The variable-pitch propeller, like other things, has come when it was wanted, and not before. In the past enthusiasts attempted to justify its use on the grounds that it would enable the engine to run at full speed on the ground, with consequent increase in available power for take-off, and on those primary grounds I think the experts were quite right, and would still be right in saying that the nett gain could not possibly justify the weight, cost and complication. Equally, any other device such as a two-speed gear, unless it is exceptionally light and simple, would not be worth while.

"Why, then, do I think the variable-pitch propeller is now justified? New conditions have arisen. The speeds of ordinary commercial and military aircraft are reaching values which five years ago were regarded as possible only in a Schneider Cup machine, and the end is not yet. At the same time the rotational speed of the propeller remains limited in relation to the speed of sound. Hence pitch/diameter ratios (which means blade angles) are increasing and have now in many aircraft reached to such a value that the blades stall in exactly the same way as a wing at low speed.

"Fig. 1 represents the blade angle for a low-speed aircraft and Fig. 2 for a high-speed aircraft. A.C. represents the rotational speed, approximately constant, and A.B. the



aircraft speed, continually increasing. Neglecting for clearness of explanation the inflow angle, B.C.A.—the blade angle—represents the angle of incidence of the blade at no forward speed. Obviously, in Fig. 2, the angle is so big that the blade is stalled at low speeds for take-off, with consequent severe loss of thrust. The only way of getting the blade out of stall is to reduce the blade angle. True, this will increase the r.p.m.—a good point—but not the main justifying point. The main justifying point is that the reduction of blade angle brings it out of stall.

"I am labouring this point because once it is clear it is equally clear that the two-speed gear will not do the trick. *It will not bring the blade out of stall,* and unless it does this the increase of engine r.p.m. in itself is not sufficient to justify the weight, etc., of the variable-pitch propeller.

"The same argument applies to some extent to the use of special fuels for ground boosting. The extra power obtained has some effect, but it is used very inefficiently indeed—actually at the efficiency, whatever it is, of the blade in the stalled condition.

A Rough Guide

"So I am driven to conclude that the controllable pitch is the best solution for high-speed machines. For exactly the same reasons I am equally clear that unless the conditions are such that the fixed-pitch propeller would stall on the ground the variable-pitch propeller is not justified. For rough and ready guidance, if you want to decide when and where it will pay to fit a variable-pitch propeller, look at the pitch and diameter stamped on the fixed-pitch propeller already fitted. If the pitch is less than the diameter it will not pay. If the pitch is equal to the diameter but less than 1.2 you are in the No-Man's-Land where differences of opinion are legitimate; and beyond this the more the pitch is larger than the diameter, so, more and more, will the variable-pitch propeller be worth while.

"Such is a 'rough and ready' guide, but it is common sense that every wise designer will consider each case on its particular merits."

Mr Stanley H. Evans, assistant designer to the Heston Aircraft Co., writes:—

"I am in complete agreement with your views, as I think the controllable-pitch solution is the most economical engineering scheme when compared with either the two speed reduction gear or specially doped fuel for take-off. I cannot believe that the extra weight of an engine gear box will be as low as a sound C.P. mechanism, nor as mechanically straightforward. And I frankly shy at the fuel system problem involved in employing special take-off tanks and the attendant plumbing for, say, a multi-engined layout; the installation is complicated enough already.

"A study of American technical data—the only up-to-date source at the moment—indicates some of the following advantages: (1) The primary benefit of a C.P. airscrew comes from its ability to maintain the maximum allowable engine revolutions and power at all flight speeds, rather than to any increase in the airscrew efficiency itself. (2) A secondary advantage is due to the use of the larger diameter necessary for the C.P. airscrew, thereby giving a better all-round performance to the aeroplane, except for a negligible loss in high speed. (3) The C.P. airscrew shows up to greater advantage with a geared engine. (4) It becomes even more necessary for use with a supercharged engine. (5) A C.P. airscrew increases the climb and ceiling, reduces the take-off run, and above the critical altitude of the engine it increases the high speed

"Citing a particular case in which I was interested, the Douglas 'gullwing' observation monoplane, powered with the Curtiss 'Conqueror' water-cooled engine and geared airscrew running at 5-7ths engine speed, here are some comparative performance characteristics:—

		Fixed Pitch.	Contr. Pitch.
Gross Weight	(lb.) ...	4,865	4,950
Horse-power	(b.h.p.) ...	600 at 2,450	—
Airscrew Diameter	(ft.) ...	10.0	10.5
Top Speed	(m.p.h.) ...	191	190
Initial Climb	(ft./min.) ...	1,800	2,150
Take-off Run	(ft.) ...	674	450

"The best argument of all, however, is the fact that American controllable-pitch airscrews, such as the Hamilton and the Smith, are being used in regular transport service every day in the United States. Modern twin-engined transports like the Boeing '247-D' and the Douglas 'D.C. 2' owe their ability to maintain altitude with one engine to the installation of C.P. airscrews. On the other side they have ceased to argue the problem and the C.P. airscrew is accepted as a practical reality, which delivers the goods—or, rather, horses—while the other two suggested solutions are still somewhat nebulous at present.

"My feeling, therefore, is that 'a horse in the hand is worth two in the stable,' and it is very gratifying to know that De Havillands have had the vision to introduce the Hamilton airscrew for the use of aircraft designers in this country. And Heaven (which was once on the side of the English) knows that we sadly need a little more vision in this dear old country. All of which means that your article was very timely, so here's hoping you'll stick to your guns."

200-m.p.h. Flying Boats

Mr. A. Gouge, General Manager of Short Bros., Ltd., writes:—

"After reading your most interesting articles in *Flight* on controllable-pitch airscrews, there is no doubt in my mind that your conclusions are absolutely correct; controllable-pitch airscrews are becoming an absolute necessity and are of far more importance than two-speed reduction gears or even ground boosting. Ground boosting, in particular, is extremely valuable, but only, I think, if advantage can be taken of it by improving the efficiency of the blade angles at speeds from rest up to the take-off speed, as obviously no gain would result by pushing more and more power into an airscrew in the nearly stalled condition. Ground boosting is preferable to a two-speed reduction, as it does not usually involve much increase in weight.

"Without going a great deal further into the matter it is difficult to say whether we could successfully use the whole of the additional horse-power obtained from ground boosting, and care will have to be taken to strike a true balance between diameter and pitch which will give the maximum efficiency both for cruising and take-off.

"I have been doing a little work lately on the probable type of flying-boat that will be developed in the future, and I have come to the conclusion that wing loadings are likely to be increased to round about 40lb. per square foot and cruising speeds round about the 200 m.p.h. mark. If this is actually so, there can be no question that controllable-pitch airscrews must be fitted if take-offs are to be reasonable or even possible.

"Of course, the flying-boat is in rather a better position than the corresponding landplane owing to the usually unlimited space for taking-off and landing, and as the C. of A. limit for take-off is 60 seconds there is no doubt that with C.P. airscrews the above wing loading, or even higher loadings, could be employed if we were satisfied that aerodynamically we should not run up against any 'snags.'"

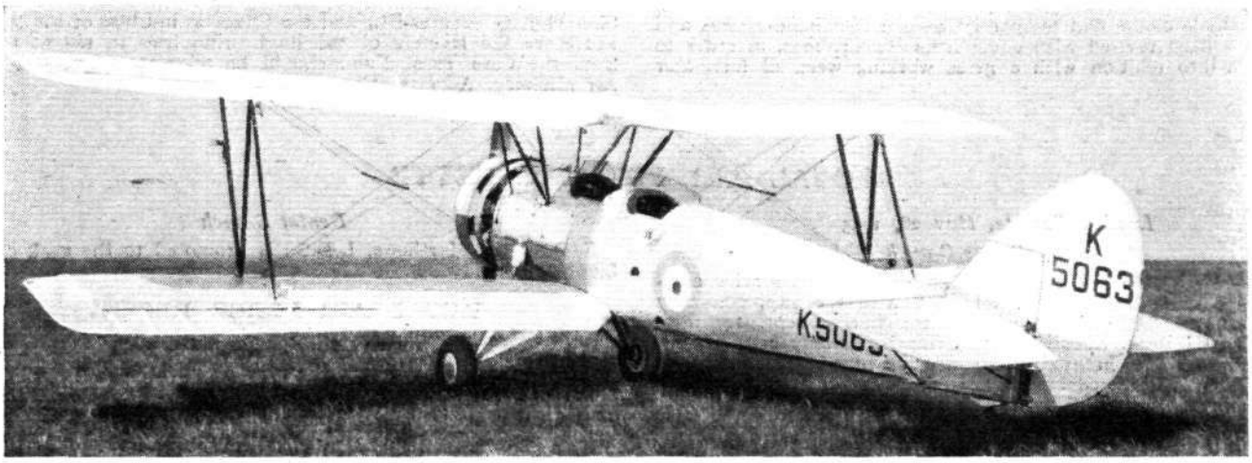
ELECTION OF S.B.A.C. OFFICERS

Sir Robert McLean was last week appointed chairman of the Society of British Aircraft Constructors in succession to Mr. Herbert J. Thomas, of the Bristol Aeroplane Company, Ltd., who has held the position for the past two years. Mr. Hugh Burroughes (Gloster Aircraft Company, Ltd.) was re-elected deputy-chairman (Aircraft), and Air Vice-Marshal A. E. Borton (D. Napier and Sons, Ltd.) was elected deputy-chairman (Engines). Mr. John Lord, joint managing director of Saunders Roe, Ltd., was again elected to the post of treasurer.

Sir Robert McLean, the new chairman, is chairman of Vickers (Aviation), Ltd. He has been in charge of Vickers aviation interests since his retirement from Government service in India in 1927

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS *AIR MINISTRY ANNOUNCEMENTS*



SCHOLASTIC. This special version of the Avro "Tutor" (215 h.p. "Lynx") built for Royal Air Force use, and known officially as the "Prefect," is to be used initially for navigational training; a number are on order. Increased tankage appears to be a feature.

THE ROYAL REVIEW

IN addition to those already published in *Flight*, further details regarding His Majesty the King's Review of the Royal Air Force on July 6 have been made public. Points from the Air Ministry announcement are as follows:—

His Majesty the King, who is Chief of the Royal Air Force, will wear the uniform of a Marshal of the Royal Air Force at the Review, which is part of the celebrations for his Silver Jubilee.

The Review will take a double form—an inspection on the aerodrome at Mildenhall, Suffolk, of about 350 aircraft and their personnel, drawn from nearly forty squadrons, and a fly-past over Duxford aerodrome, Cambridgeshire, of the greater part of these units in formation.

The concentration of aircraft at Mildenhall will be the largest number ever assembled at one aerodrome in this country. The units will be mainly drawn from the Air Defence of Great Britain Command, which will be represented by fighter and bomber squadrons of the Regular and the Auxiliary Air Forces; the Inland Area Command will have present two Army Co-operation squadrons, and the Coastal Area Command will be represented by the Coast Defence Development Unit.

His Majesty will drive by car from Newmarket to Mildenhall, where he is due to arrive shortly before 11.30 a.m. He has commanded the Marquess of Londonderry, Secretary of State for Air, to accompany him from Newmarket.

The Reception

On arrival at the Aerodrome, the King will be received by the Lord-Lieutenant and High Sheriff of Suffolk.

The Secretary of State for Air will present:—The Air Officer Commanding the Review (Air Chief Marshal Sir Robert Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., A.D.C., Air Officer Commanding-in-Chief, Air Defence of Great Britain); Air Chief Marshal Sir Edward Ellington, K.C.B., C.M.G., C.B.E., Chief of the Air Staff, the remaining Service Members of the Air Council, and other senior officers of the Royal Air Force.

After inspecting the Royal Air Force Guard of Honour, His Majesty will begin his inspection of the assembled squadrons, which will be drawn up in review formation in eight rows. The King will drive slowly along the semi-circular lines of aircraft, a distance of nearly five miles; his tour will occupy nearly three-quarters of an hour. His Majesty, accompanied by the Secretary of State for Air, will then drive by car to Duxford, where he will join the Queen, who will previously have arrived there from Cambridge. Luncheon will be served privately in the Officers' Mess to the Royal Party.

During this period the allotted squadrons will take off from Mildenhall, and will take up their assigned order for the second part of the Royal Review. Shortly before 2.30 p.m., Their Majesties will proceed to the Royal dais on the north side of Duxford aerodrome, from which they will review the squadrons in flight, and the King will take their salute.

The Air Force units will fly over in squadron formation in succession at intervals of half-a-minute, and immediately this fly-past has been completed, a display of squadron drill by one Fighter squadron will take place.

The other squadrons will, in the meantime, have assumed wing formation, and will then carry out a fly-past in succession of wings.

The ceremony is timed to terminate at 2.55 p.m., when Their Majesties will leave Duxford by motor-car for London.

The units taking part will be as follows:—

Fighter Squadrons.—Nos. 19 ("Gauntlet"), 1, 43, 25 ("Fury"), 23 ("Demon"), 56, 54, 32, 111, 3, 17 ("Bulldog"). *Light Bomber Squadrons.*—Nos. 12, 142, 15, 18, 57 ("Hart"), 35 ("Gordon"). *Medium Bomber Squadron.*—No. 101 ("Overstrand"). *Heavy Bomber Squadrons.*—Nos. 10, 99 ("Heyford"), 7, 58, 9 ("Virginia"). *Coast Defence Unit* (Gosport).—Various types. *Army Co-operation Squadrons.*—Nos. 2, 26 ("Audax"). *Special Reserve Squadrons.*—Nos. 501, 504 ("Wallace"), 503 ("Hinaidi"), 500 ("Virginia"). *Auxiliary Fighter Squadrons.*—Nos. 600, 601, 604 ("Hart"). *Auxiliary Light Bomber Squadrons.*—Nos. 602, 603, 605 ("Hart"), 607, 608 ("Wapiti").

Certain of the above units will not take part in the fly-past, being confined to the Mildenhall inspection only. These are as follows:—Squadrons Nos. 35, 101, 7, 58, 9, 501, 504, 503, 500, 600, 601, 604, 602, 603, 605, 607, 608, and Coast Defence Unit.

OFFICERS AT HENDON DISPLAY

Sqn. Ldr. G. V. Howard, D.F.C., armament specialist at headquarters of the Fighting Area, Uxbridge, has been appointed armament officer for the R.A.F. Display, and as such will be responsible for all pyrotechnics at Hendon on June 29. Last year Sqn. Ldr. Howard was in charge of the "set piece," when an explosive magazine was bombed from the air.

Sqn. Ldr. Vincent Greenwood, chief signal officer, Fighting Area, is to act as display duty pilot. Flt. Lt. A. C. B. Harrison, M.C., of the personnel staff, Fighting Area, will act as his assistant. Sqn. Ldr. G. E. Wilson, from the command of No. 56 (Fighter) Squadron, North Weald, will act as staff officer to the A.O.C., Flying (Air Vice-Marshal P. B. Joubert de la Ferté). Sqn. Ldr. H. A. Hamersley, who was promoted on April 1, will be assistant dispatching officer.

R.A.F. BENEVOLENT FUND

The second Council Meeting of the year was held at Iddesleigh House, London, recently, with Viscount Wakefield of Hythe in the chair. The Honorary Treasurer reported that for the period March 1, 1935, to May 1, 1935, the expenditure upon relief

grants alone amounted to £1,679 17s. 8d. This figure does not include the cost of upkeep of the Vanbrugh Castle School nor the subscription of £300 per month paid to the Officers' Association for the assistance of war time R.A.F. Officer cases. The grants expenditure during this period of the Council year was now in excess by £377 over the same period a year ago, although the number of applications dealt with was less. The Hon. Treasurer also announced that the donations received for the Council year up to May 1, 1935, totalled £500 less than a year ago. He had great pleasure, however, in informing the Council that Lord Wakefield had very generously made a donation of £500 to the Fund, and that one hundred guineas had been received from the Fairey Aviation Company, and another one hundred guineas from Rolls Royce, Ltd.

PAY OF CLERKS

As the result of the reduction in the hours of attendance of outstation staffs, the rates of pay of air service clerks (special class), temporary male clerks and temporary women shorthand-typists and typists, has been revised with effect from May 1, 1935, in order to bring them into relation with a gross working week of forty-four hours.

FOREIGN OFFICER WITH THE R.A.F.

Major Ikemoto, of the Japanese Military Air Service, is attached to the School of Accounting and Storekeeping, Cranwell, for the period May 7, 1935, to June 30, 1935.

GRANT OF SYMBOL

F/O. A. Wall, having successfully completed the Advanced Supplies Course which terminated on December 20, 1934, and No. 21 War Course which terminated on March 27, 1935, both held at the R.A.S.C. Training Centre, Aldershot, is granted the symbol "C."

THE CASE TRUST FUND

The Case Trust Fund was formed in 1929 through the generous bequest of a sum of £5,000 by the Reverend Joshua John Case, of Plymstock, Plymouth. The object of the fund is to assist the training as candidates for ordination as clergymen of the Church of England of persons who have served as officers or airmen in the Royal Air Force. The Reverend J. J. Case, The Rt. Hon. Sir Samuel J. G. Hoare, Bt., and the Chaplain-in-Chief of the Royal Air Force are the trustees of the fund. Enquiries in regard to grants from the Case Trust Fund should be addressed to the Secretary, Air Ministry, Adastral House, Kingsway, W.C.2.

ROYAL AIR FORCE GAZETTE

London Gazette, May 28, 1935

General Duties Branch

Capt. M. C. Lasseter (R.A.R.O.) is granted a short service commission as a Flight Lieutenant on probation in the Supplementary List, with effect from May 1 and with seniority Sept. 14, 1928. (Substituted for the notification in the *Gazette* of May 21.)

The following are granted temporary commissions as Flying Officers on being seconded for duty with the Royal Air Force (May 19):—Lt. T. K. Lacey (The Gloucestershire Regt.); Lt. P. W. Stansfeld (The Royal Tank Corps).

Pilot Officer on probation A. F. Johnson is confirmed in rank (April 30); F/O. V. C. F. Streatfeild is promoted to the rank of Flight Lieutenant (April 14); P/O. J. G. Macintyre is promoted to the rank of Flying Officer, with effect from March 29 and with seniority of Sept. 29, 1934.

The following Pilot Officers are promoted to the rank of Flying Officer:—J. R. Maclachlan (Nov. 26, 1934); C. F. S. Fraser (Feb. 12); J. N. Tomes (Feb. 24); W. B. Fleming (April 2); G. H. Gatheral (May 1).

Lt. N. G. R. Crawford, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on return to Naval duty (May 7).

Stores Branch

The following Flying Officers are promoted to the rank of Flight Lieutenant (April 28):—E. N. A. Crowe-Browne, L. F. Oldridge, A. W. Rule, P. Dennehy, P. V. Edwards, F. G. Lee.

Flt. Lt. C. E. Tidy is placed on the retired list on account of ill-health (May 25).

Medical Branch

The following are granted short service commissions as Flying Officers on probation for three years on the active list, with effect from May 7 and with seniority of the dates stated:—R. C. H. Tripp, M.R.C.S., L.R.C.P. (Jan. 8, 1934); P. A. Cooper, M.R.C.S., L.R.C.P., L. E. A. Dearberg, M.R.C.S., L.R.C.P., H. L. Willcox, M.B., Ch.B. (May 7, 1934); A. R. C. Young, M.R.C.S., L.R.C.P. (Aug. 7, 1934).

Flt. Lt. P. D. Barling, M.B., Ch.B., is promoted to the rank of Squadron Leader (May 25); Wing Cdr. A. J. Brown, D.S.O., M.R.C.S., L.R.C.P., is placed on the retired list (May 26).

Dental Branch

F/O. R. H. Marthews, L.D.S., is promoted to the rank of Flight Lieutenant (May 29).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

J. L. C. Newton is granted a commission as Pilot Officer in class C on resigning his commission in the Special Reserve (Oct. 10, 1934).

The following Flying Officers are transferred from class A to class C:—E. P. Clacey (April 30); H. A. Francis, A.F.C. (May 3).

The following Flying Officers relinquish their commissions on completion of service:—N. McLeod (March 13); R. W. O'Sullivan (May 5); E. Cramp (May 15).

Flt. Lt. C. A. Elliott relinquishes his commission on completion of service and is permitted to retain his rank (Dec. 12, 1934); F/O. K. W. McQueen relinquishes his commission on appointment to a commission in the Royal Army Service Corps (March 16); Flt. Lt. T. Courtis resigns his commission (March 24).

SPECIAL RESERVE

General Duties Branch

A. P. B. Holmes is granted a commission as Pilot Officer on probation (May 5); P/O. J. A. C. Warren is promoted to the rank of Flying Officer (May 29); P/O. J. L. C. Newton resigns his commission (Oct. 10, 1934).

AUXILIARY AIR FORCE

General Duties Branch

No. 604 (COUNTY OF MIDDLESEX) (FIGHTER) SQUADRON.—F/O. R. A. Chisholm resigns his commission (Jan. 24).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

R. A. Chisholm is granted a commission as Flying Officer in class A (Jan. 24).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander.—P. Huskinson, M.C., to Air Armament School, Eastchurch, 15.5.35; for Armament duties vice Wing Cdr. E. H. Sparling, A.F.C.

Squadron Leader.—R. L. McK. Barbour, D.F.C., A.F.C., to D.D.W.O., Dept. of A.M.S.O., Air Ministry, 4.4.35.

Flight Lieutenants.—B. W. Knox, to Air Armament School, Eastchurch, 9.5.35. C. McK. Grierson, to No. 230 (F.B.) Squadron, Pembroke Dock, 4.5.35. C. R. Smythe, to School of Naval Co-operation, Lee-on-the-Solent, 4.5.35. J. G. Franks, to No. 57 (B) Squadron, Upper Heyford, 24.5.35. J. F. F. Pain, to No. 16 (Army Co-operation) Squadron, Old Sarum, 23.5.35.

Flying Officers.—N. C. Hendrikz, to No. 2 Flying Training School, Digby, 7.5.35. R. A. Phillips, to No. 204 (F.B.) Squadron, Mount Batten, 15.4.35.

Pilot Officers.—C. Charlton-Jones, to No. 821 (F.S.R.) Squadron, 10.5.35. E. F. E. Barnard, to No. 29 (F) Squadron, North Weald, 13.5.35. D. O. Finlay, to No. 17 (F) Squadron, Whyteleafe, 13.5.35. W. W. Loxton, to No. 1 (F) Squadron, Tangmere, 13.5.35. N. F. Simpson, to No. 56 (F) Squadron, North Weald, 13.5.35. K. G. Stodart, to No. 17 (F) Squadron, Whyteleafe, 13.5.35. W. E. Carr, to No. 56 (F) Squadron, North Weald, 4.5.35. F. F. Essam, to No. 32 (F) Squadron, Biggin Hill, 20.5.35, on appointment to short-service commission.

Medical Branch

Group Captain.—A. Grant, M.B.E., to Headquarters, R.A.F., India, 20.4.35; for duty as Principal Medical Officer vice Wing Cdr. R. W. Ryan.

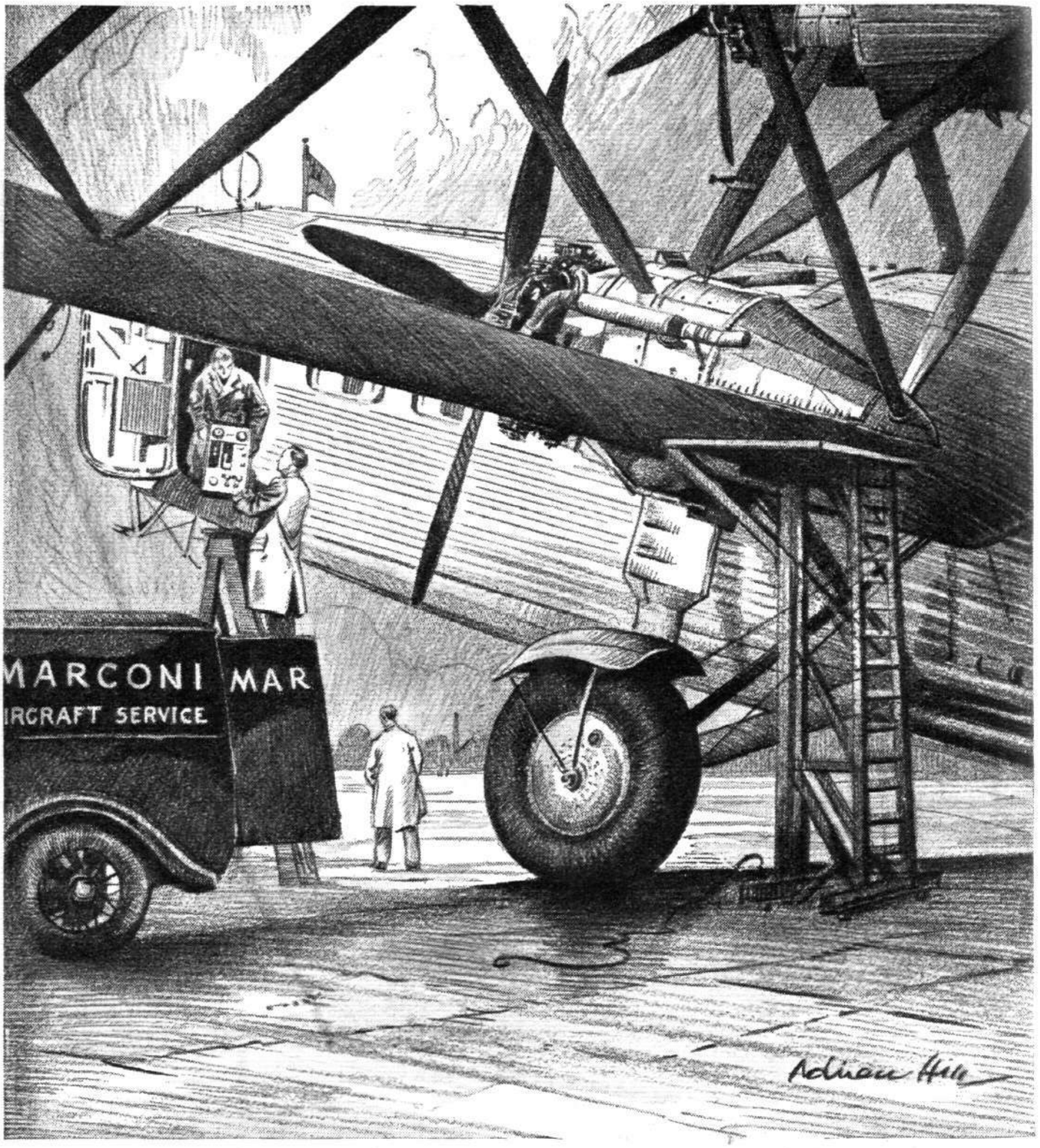
Wing Commanders.—W. G. L. Wambeek, to Station Headquarters, Heliopolis, Egypt, 20.4.35; for duty as Medical Officer. T. Montgomery, to Headquarters, Western Area, Andover, 26.5.35; for duty as Principal Medical Officer vice Wing Cdr. A. J. Brown, D.S.O. P. T. Rutherford, O.B.E., to No. 6 Flying Training School, Netheravon, 13.5.35; for duty as Medical Officer.

Flight Lieutenant.—J. Magner, to Marine Aircraft Experimental Establishment, Felixstowe, 17.5.35.

Flying Officers.—The following Flying Officers were posted to Medical Training Depot, Halton, 7.5.35, on appointment to Short Service Commissions:—P. A. Cooper, L. E. A. Dearberg, R. C. H. Tripp, H. L. Willcox, A. R. C. Young.

J. C. Blair to Station Headquarters, Amman, 20.4.35.

A. W. Smith, to R.A.F. General Hospital, Hinaidi, 17.5.35.



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HESTON NOCTURNE

Floodlit Flying at Night Display Organised by the Household Brigade Flying Club

AT Heston on Wednesday night of last week quite a number of people awoke for the first time to the realisation of just how far nocturnal aeronautics have progressed since benighted R.F.C. pilots first landed alongside "L's" of flaming petrol buckets.

The occasion was the Household Brigade Flying Club's Night Flying Display, and no one can doubt that everybody (each body with at least one motor car, if the jam in the narrow road outside was any criterion) in the big crowd was duly impressed.

By way of an overture Capt. V. H. Baker (chief instructor to Airwork, Ltd., and the organising club) demonstrated *demande et réponse* between his Avro "Cadet" and the control tower, and then took off along, and subsequently landed along, the modern equivalent of petrol buckets—a line of Haig portable neon lights, which, being accumulator fed, are sufficient unto themselves.

The Chance floodlight on the control tower having suddenly turned night into day (optically, if not thermometrically), Mr. Lindsay Everard's "Dragon" and "Leopard Moth," in the respective hands of Lt. C. Phillips, R.N. (Ret.) and Mr. P. G. Reiss, proceeded to demonstrate that instrument's utility, with and without the shadow-bar.

Then the stage was plunged into darkness again that Mr. A. Coleman, of Airspeed, Ltd., might prove the effectiveness of landing lights in the leading edge of an "Envoy's" wing. Taking off along its own beam, the "Envoy" made a circuit, then Mr. Coleman brought it in and put it down very nicely after a finely judged, low approach over the south-west corner. It was a neat piece of flying, and the odd wisps of mist blowing along on the wind must have made it a trickier business than it otherwise would have been.

Flt. Lt. Clarkson then took a "Moth" up to 2,000 ft., a couple of searchlights were directed on to him by the 26th (London) Anti-Aircraft Searchlight Battalion, and he proceeded to aerobat in the beams—a very pretty spectacle.

The searchlights were next trained on an Autogiro flown by Mr. Brie and one was led to muse that one of these machines with dark-coloured rotor blades would offer a difficult target for a light. Mr. Brie made his customary vertical landing.

During the final flying item democratic hot dogs grew cold and plutocratic champagne grew warm, for all eyes were on the "Cadet" which Capt. Baker crazy-flew round the aerodrome in the floodlight. Mostly carried out well below 100 ft., it would have been an inspiring enough show in daylight; here it was simply terrific, and how the pilot managed to see during his swift transitions from light to darkness passes understanding.

A club prize-presentation of the Madocks Cup, Non-Serving Members' Cup and Lady Members' Cup (awards for a landing competition) next took place, then all four Chance floodlights were switched on as a *finale*, and joy-rides to see the lights o' London rounded off the evening.

A small section of the big crowd—taken by the control-tower floodlight. Those in the foreground are marking time —on Heston's big clock.
(*Flight* photographs.)

OFF PLYMOUTH HOE

Fighter versus *Flying-Boat : Attacks by No. 54 (Fighter) Squadron on No. 204 (Flying-Boat) Squadron*

By Major F. A. de V. ROBERTSON, V.D.

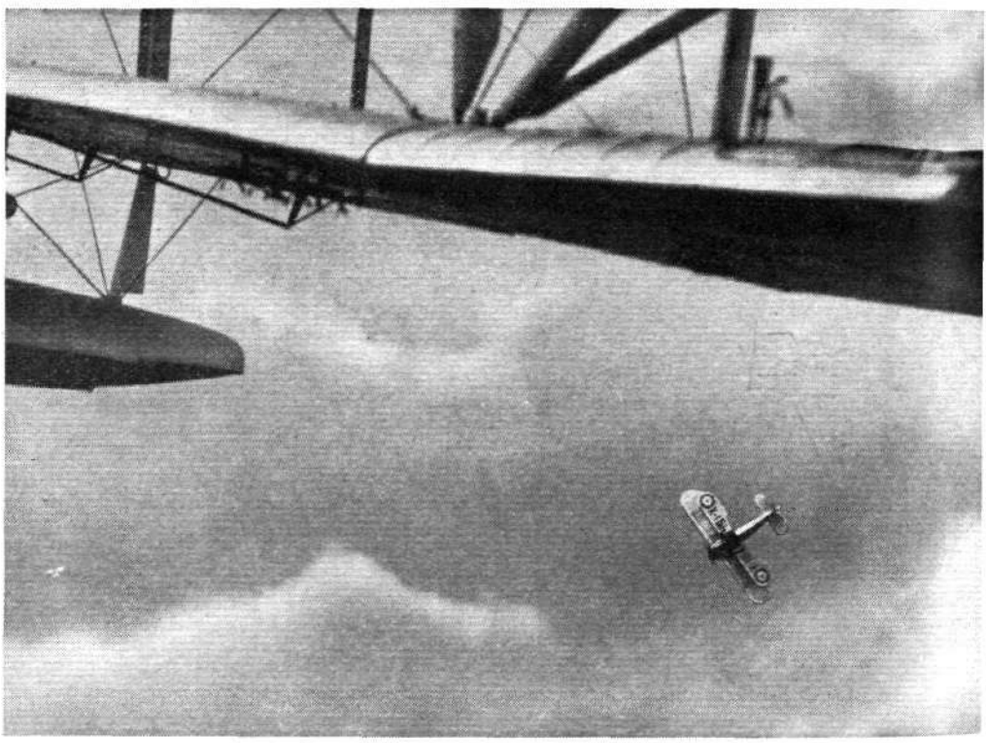
THERE was a time, subsequent to Noah's happy landing of the Ark on Mt. Ararat, when the "Southampton" was the finest flying-boat in the world. Critics were then most indignant because the Air Ministry would not enter it for world's records under F.A.I. rules, as it was confidently believed that it could have captured quite a respectable number of them.

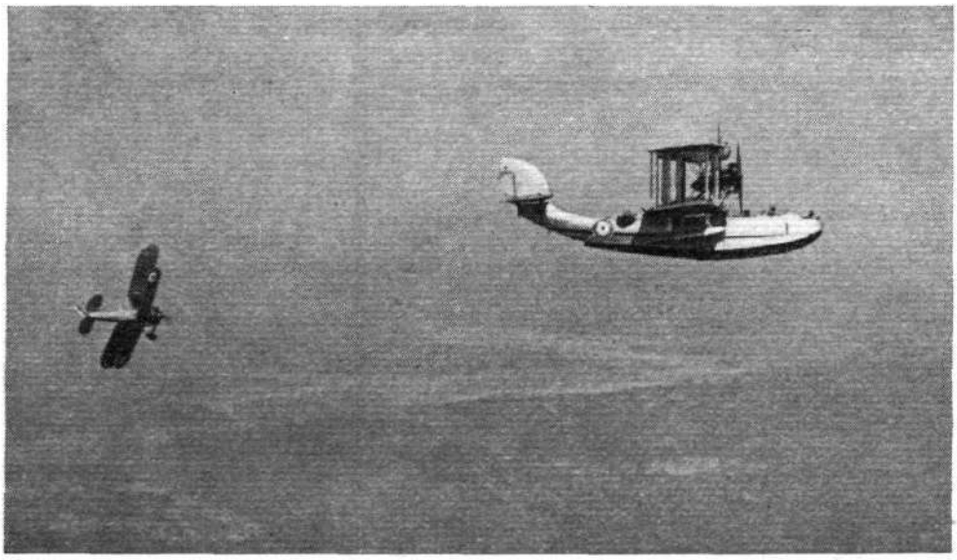
There was another time, even later, when the "Bulldog" was the very latest word in single-seater fighters; when dashing young pilots at Upavon talked contemptuously of the bad old days of the "Woodcock" and the "Gamecock," pitied the squadrons which still flew "Siskins," and then, in tones which ill-concealed their self-satisfaction, remarked, "*We* have 'Bulldogs'".

And, of course, there will come a time when men will compare the "Gauntlet" with a tortoise.

Be that as it may, it was with a feeling of visiting an antiquarian museum that *Flight* went down to Plymouth to see something of the affiliation (*i.e.*, inter-squadron exercises) of No. 54 (Fighter) Squadron, which flies "Bulldogs," with No. 204 (Flying-Boat) Squadron, which possesses "Southamptons." It did not really matter that both types are now antiquated, and will soon be replaced. The interest lay in the tactics of fighters and flying-boats when engaged in mock combat. No. 54 F.S. live at Hornchurch, in Essex, and they flew down to Plymouth on Jubilee Day, May 6, and encamped under canvas on Roborough aerodrome outside the city. No. 204 F.B.S. still inhabits Mount Batten. It used to have as stablemates there No. 209 F.B.S., the proud possessors of "Perth" flying-boats with three "Buzzards" apiece and a C.O.W. gun in the nose, but No. 209 has temporarily moved to Felixstowe, and it is understood that it will ultimately go to Pembroke Dock when No. 230 F.B.S. is ready to move to Singapore.

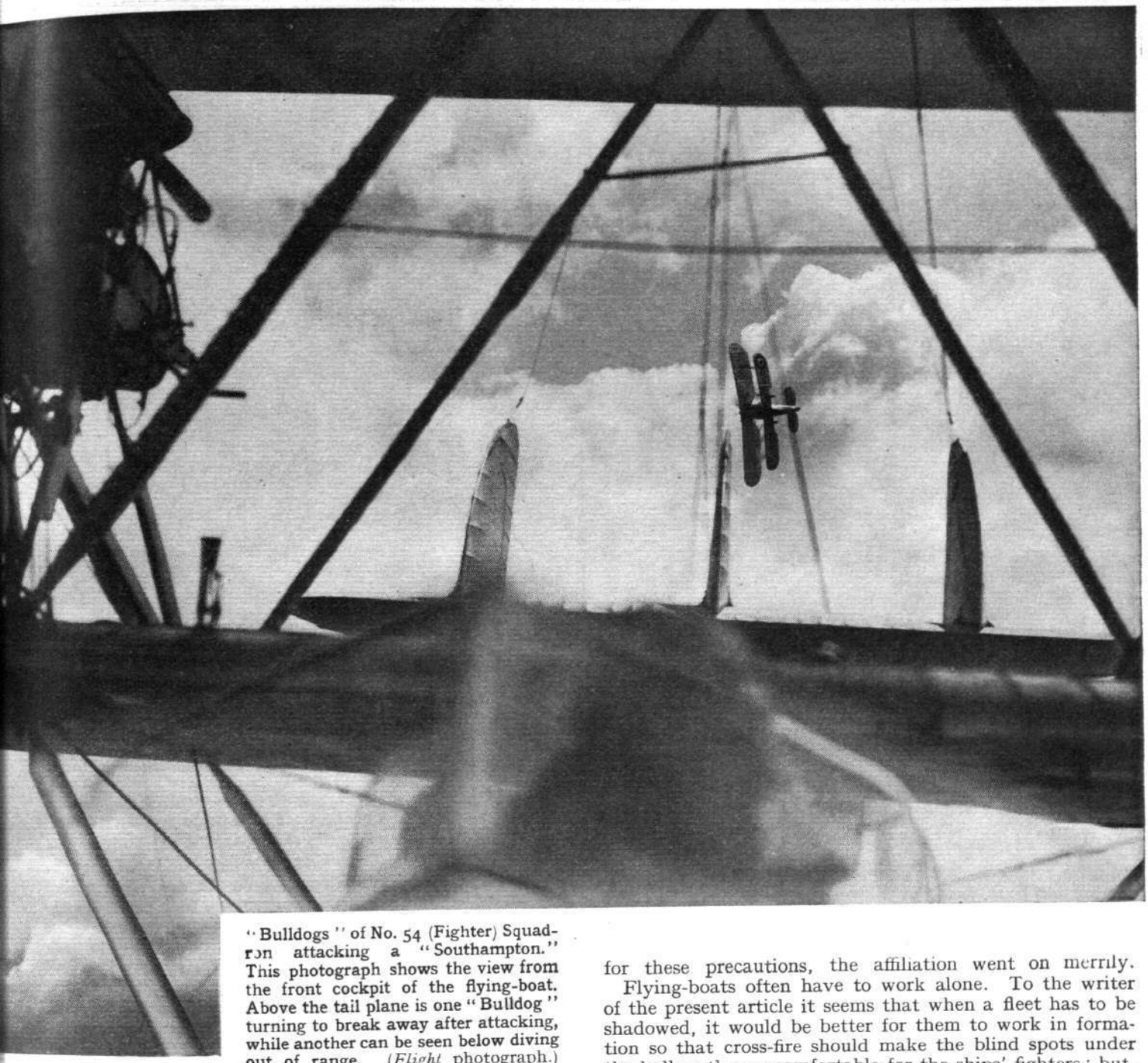
The affiliation lasted about a fortnight, and there were not many days when the weather made flying impossible. There certainly was one most unpleasant morning when snow fell thickly and was followed by violent hail. That, of course, was in answer to the prayers of those sun-haters who had been moaning about a coming drought, and saying that their gardens were dried up and the crops would be ruined. It is to be hoped that they enjoy the sight of the fruit crops now. Anyone in Great Britain who prays for rain deserves all that he gets—and sooner or later he always gets it.





A "Southampton" attacked from the rear by a "Bulldog," as seen from another boat of No. 204 (Flying-Boat) Squadron. (*Flight* photograph.)

On the whole, Nos. 54 and 204 had quite a successful affiliation. Sham fighting is always unreal, and it must be protracted to give everyone some practice. If anyone were to win the war straight away, it would be a calamity, and speedy victory is, therefore, against the rules. The flying-boat pilots say that they hold a trump card when attacked by fighters. They come down and fly as low as possible over the water so that the fighters cannot investigate possible blind spots underneath. In the days of Von Richthofen it was everything for a fighter to keep above its adversary or its prey, though occasional cunning stalkers like Ball used to exploit surprise and the blind spot. Nowadays flying-boats and some



"Bulldogs" of No. 54 (Fighter) Squadron attacking a "Southampton." This photograph shows the view from the front cockpit of the flying-boat. Above the tail plane is one "Bulldog" turning to break away after attacking, while another can be seen below diving out of range. (*Flight* photograph.)

bombers command such a field of fire overhead that the fighters do not think so much of the "bolt from the blue" tactics. Therefore, if flying-boats flew low over the sea they would handicap the fighters too severely for the affiliation to be very instructive. Moreover, if an impetuous pilot delayed his pull-out too long, dives by the fighters would have an element of danger. In consequence, the fiat went forth that there must be no sham fighting below 2,000 feet.

The fighters also had to put up with some restrictions in the interests of safety. "Southamptons" have no gun position aft of the rudders, but all the latest flying-boats have tail gunners, and therefore no useful lessons can be learnt by relying on the absence of the sting in the tail. On the other hand, the "Southamptons," in common with other types of boat, have gunners in the nose. It is a nice point for the fighters to decide whether attacks from behind or from in front would give them the best chance of success. To charge head-on in war might be taking only a legitimate risk, but in sham fighting the risks of a collision would be too great, and so the fighters were forbidden to attack from in front. Making allowance for these precautions, the affiliation went on merrily.

Flying-boats often have to work alone. To the writer of the present article it seems that when a fleet has to be shadowed, it would be better for them to work in formation so that cross-fire should make the blind spots under the hulls rather uncomfortable for the ships' fighters; but, when the total number of flying-boats is limited, formation work is not always possible. A single boat has to learn to hold its own against a flight of fighters, and certainly the tail gun position greatly reduces the blind area underneath the hull. The first exercise practised in the affiliation at Plymouth was the attack by a flight of three "Bulldogs" on a single "Southampton." This was followed by attacks by flights of fighters on three boats flying in formation. The boats flew up and down the Devon coast, keeping within reach of land, as the fighters are landplanes and had no flotation gear. The whole of No. 54 F.S. would come out, but each flight in rotation would practise its attacks by itself. When the fighters' petrol ran low, they would retire to Roborough, fill up, and come out again, while the "Southamptons" carried on up and down the coast. The "Southampton" is slow, according to modern ideas, but it can keep on cruising for nine or ten hours.

The "Bulldogs" kept attacking from the rear, and when they were directly behind a "Southampton" they were well shielded by the triple fins and rudders. There are three gun positions in a "Southampton," one in the extreme nose, and two behind the wings. These last two are staggered. When a "Bulldog" dived to break away

No. 54 (Fighter) Squadron, flying Bristol "Bulldogs" ("Jupiter" engines), rallying after an attack on the "Southamptons" (Napier "Lion" engines) of No. 204 (Flying-Boat) Squadron. One fin and rudder of a flying boat appears to the left of the picture. (*Flight* photograph.)

from its attack it came under fire from several guns, and the leading boat, being at a lower altitude than the other two, had the best opportunity to bring its guns into action. The gunners had to be quick, for a "Bulldog" does not exactly stand still in the air when breaking away from an attack.

The final stage was an attack by the whole of No. 54 F.S. on the three "Southamptons." In this case No. 204 F.B.S. represented a squadron of bombers, each boat being regarded as a flight of three bombers. It is this attack which is illustrated by the photographs which accompany this article.

Briefly, the fighter squadron divided itself into two parties of five and four machines respectively, and each party tackled one of the rear flights (*i.e.*, boats) of the flying-boat squadron. The tactics were to eat up the F.B. squadron from the tail. Again, these tactics seem more attractive when the machine attacked has no gunner aft of the rudders. But even if there had been rear gunners the fighters would have outnumbered them. The number of gunners would vary according to whether the "Southamptons" represented "Harts" or "Heyfords" or "Scapas." The position of gun cockpits would also vary according to the supposition. "Heyfords" and "Scapas" do not usually fly in squadron formation of nine machines; "Harts" do fly in that formation, but their gunners in each machine are situated forward of the empennage. In any case, there would never be nine guns with a perfectly clear field of fire on the nine attacking fighters.

Despite all this make-believe, the exercise was excellent practice for both squadrons, and the films of the camera guns showed the probable casualties on both sides. The reports of both squadrons on this affiliation will certainly be of great interest to the H.Q. staffs of the Coastal Area and the Fighting Area. It is only by sedulous practice in peace time that the R.A.F. can make itself ready for the war which we all hope will never come.

AERONAUTICAL COURSES AT LOUGHBOROUGH COLLEGE

THE engineering courses at Loughborough College, Leicestershire, have earned an enviable reputation. Perhaps it is not so well known that the College now offers a very complete course in aeronautical engineering.

Normally, the course is of four years' duration, at the end of which a student should qualify for the college diploma in aeronautical engineering. For an honours diploma, however, a fifth year post-graduate course is essential. The subjects taken during this year depend largely on the student's choice; for example, he may specialise in any particular branch of aeronautical engineering.

The four-year course is designed to enable the student to obtain a ground engineer's licence, while the specialised subjects taken during the fifth year are arranged to cover the syllabus for the Associate Fellowship and Membership Examination of the R.Ae.S. In certain cases pupils are accepted for special courses of instruction, operating on individual time tables.

The college possesses finely-equipped laboratories and workshops, and open-air instruction in aeronautics is given under the supervision of qualified instructors at Ratcliffe and Braunstone aerodromes.

Full details of the courses are obtainable from the Principal of the College.

PRIVATE FLYING

On the Empire Routes

SOME RANDOM JOTTINGS BY LORD SEMPILL ON HIS RETURN FROM AUSTRALIA

THERE are, perhaps, a few points worth mentioning in regard to my homeward flight from Australia. Although I followed the same general route, I touched at several places not visited on the outward journey. The return flight across the Timor Sea was made from Wyndham, which involved a somewhat shorter sea passage, and it is interesting to recall that on this route the first Australian land to be sighted when crossing from Koepang is Cape Londonderry.

This being my last sight of the Commonwealth, my mind travelled homeward much faster than my machine, and I was led to conjecture how British aviation was faring under the administration of the peer after whose family the point in question was named. Those who have the interests of flying at heart in Australia are anxious to build up their services on British lines. As far as military aviation is concerned, this is most marked, a constant liaison being kept between the R.A.A.F. and the Home Air Forces, with interchange of technical information on both sides.

Designing for Australia

THE basis of civil flying has also been laid on lines adopted in this country, and it is up to British manufacturers to see that, in the future development of air transport for civil purposes in Australia, there is no necessity for aircraft operators in the Commonwealth to look elsewhere for their machines.

Although it was a matter of no consequence as far as I was concerned, it may be mentioned that in the case of a heavily laden machine the airport at Wyndham gener ally provides a better take-off than that at Darwin. The latter being the first port of call decided on for the machines used on the extension of the Imperial Service from Singapore, the Australian authorities are seeking to improve the aerodrome at Darwin, both in regard to the available landing surface and also in connection with the ground organisation generally.

The Timor Sea Again

ON my second flight across the Timor Sea I started with a full load of petrol, filling both the wing tanks and the ten-gallon auxiliary tank in the cabin. The conditions being favourable, I reached Koepang with sufficient fuel in hand. Since I last landed there, some three months before, the surface of the aerodrome had been considerably improved. The ground organisation along the route to Singapore, which has, of course, been developed by the Dutch, has been of great benefit to those who have flown to and from Australia. A most efficient air service, the K.N.I.L.M., has, in fact, long been in operation throughout the Dutch East Indies, and those responsible for this organisation have co-operated closely with British and Australian officials with a view to linking up this service with the Imperial line. Having for many years been anxious to help this country and Australia by organising a further extension of their Far Eastern Air Service, the Dutch have greatly facilitated the setting up of the final air link under British and Australian administration, not only by placing aerodrome facilities at our disposal, but by their readiness to co-operate in any modification of the ground organisation which was found to be necessary. My own experience of the Dutch air authorities, and I am sure that of all others, has always been a happy one, and I have never found lacking a desire on their part to render assistance when it was required.

I duly arrived at Singapore, where I was very kindly received by the A.O.C. He and all R.A.F. officers out here go out of their way to assist civil aviators of all nationalities.

The civil aerodrome at Singapore, which, of course, will take time to complete, will undoubtedly be, when finished, one of the finest, both in situation and equipment, in the Empire, and will certainly be in the front rank of airports of the world. Facilities are being provided for both aeroplanes and flying boats. Unlike so many airports serving important centres, the new aerodrome at Singapore will be but five minutes from the city. Even so, it will be readily accessible to all types of aircraft, care having been taken to ensure that the immediate surroundings are free from obstructions. The problems of aerodrome layout in Malaya are similar to those found generally in countries affected by monsoon conditions. Considerable attention must be paid to drainage, and some means must be found to secure a firm landing area in all weathers. In most cases this will involve the making of metalled runways such as those under construction at Penang. Considerable progress had been made there since my last visit, and no doubt the main runway, which has a length of approximately 1,000 yards, will by this time have been completed. I looked in at Kuala Lumpur on my way back, and found here also that aerodrome improvements were being effected. The flying club, which has been very active since its formation, was doing good work, and there were several lady members either qualified for their "A" licence or under initial instruction. Among the private owners are Chinese as well as British pilots.

Improvements in India

THE situation on that section of the Imperial Route controlled by the Indian Authorities is being well looked after. Landing at Akyab I found that a good deal of work was to be done at once to make the landing ground suitable for the heaviest types of machine during monsoon weather. In Calcutta further progress was observed in the arrangements for providing a new civil aerodrome to the south of the city. The site chosen, which is very much nearer the centre of the town than the airport at Dum Dum, is already being used for passenger flights. It has the further advantage of being near the river, which should enable the authorities to provide facilities for flying boats at a later date. In any scheme of improvement for the Empire Air Routes, the possibility of the use of large sea-going aircraft should not be forgotten when organisation is being planned, and sites should be favourably considered which combine suitable conditions for land aircraft and seaplanes. On the way back through India I called at Delhi, where I had occasion to land after dusk. Night-flying equipment, although it is occupying the close attention of the authorities, is not yet complete in India generally, and at Delhi I landed with the aid of kerosene flares. The D.C.A., Captain Tymms, and his greatly overworked staff, are tackling the problem continuously, and arrangements have been, or are just about to be, put in hand for the complete lighting of all aerodromes, together with the provision of intermediate beacons on the route between Karachi and Rangoon.

Private Flying

FROM THE CLUBS

Events and Activity at the Clubs and Schools

ABERDEEN

During the week ended May 25 flying time at the Aberdeen School was 11 hr. 55 min. dual and 2 hours solo.

CAMBRIDGE

During last week 64 hr. 10 min. were flown by Marshall's School and by the Cambridge Aero Club, and three new members joined. On Sunday twelve members of the C.A.S.C. were at Fen Ditton and eleven of them flew.

LIVERPOOL

Between January 1 and May 31 the Liverpool and District Aero Club flew 966 hours, and last week the figure was 96 hr. 35 min. During May, incidentally, the total was 327 hr. 40 min., showing an increase of 46 hours over the corresponding period last year.

NEWCASTLE-UPON-TYNE

The London-Newcastle air race will be run on Saturday, July 27, starting from Brooklands and finishing at the new aerodrome at Woolsington, with a turning point at Yeadon. There will be three money prizes, with the Newcastle-upon-Tyne Trophy for the winner, and a special cash prize for the fastest time. Entry forms can be obtained from the Secretary, Newcastle Aero Club, Cramlington Aerodrome, Northumberland.

NORTHAMPTONSHIRE

The prevailing bad weather brought several machines into Sywell on Saturday, and six landed because they could not get through to the south, where, of course, Brooklands was holding its garden party. Two new members—Messrs. A. Wakes-Miller and N. L. York—joined the club last week. Crilly Airways, incidentally, have been carrying full loads on the Northampton-Leicester run.

The Northampton Model Aero Club held their annual meeting on Sunday.

BROOKLANDS

Four members—Messrs. Garland, Daybell, Driscoll and Dr. Whitehurst—obtained their "A" licences last week at Brooklands, and Mr. Taylor-Young made a first solo. New members include Miss Forbes, Dr. Wilson and Messrs. Ford and Selby, the last two being the first members of the Young Pilots' Association to take flying training at Brooklands.

As the club did not have a very large number of visitors on Empire Air Day, three machines were sent to help with the joy-riding at Farnborough.

BRISTOL AND WESSEX

The event of last week was the delivery of the club's new Avro "Cadet," which was put into school work immediately on its arrival. Dr. E. A. Mayston and Messrs. B. Douglas and M. F. C. Smith made first solos, and Mr. D. A. Taylor and Miss E. K. Cook have joined as pilot members. Col. R. G. Llewellyn, O.B.E., M.C., J.P., has, incidentally, become an ordinary member. During the month of May flying hours totalled 118, which, remembering the bad weather conditions, is a figure well up to average.

On June 15 the club is holding its annual Garden Party, which, of course, is the occasion also of the S.B.A.C. race.

NORFOLK AND NORWICH

A number of trips have been made recently in the club's "Fox Moth," and it is interesting to note that, in spite of unfavourable weather, no fewer than 440 passengers were carried in this machine during last month. One new member has joined—Mr. A. T. Sawcross, who took his first lesson last Friday. Mr. J. B. Phelips has returned from Kenya, and visited the club during the week-end.

The club will be open during the Whitsun holidays.

YORKSHIRE

Last month a record total of 230 hr. 35 min. was flown on club machines, this being the highest total of any one month during the past four years, and nine new members have joined. The flying time last week was approximately 62 hours, and three new flying members joined—Messrs. A. K. Dawson, D. W. Stoll, and J. F. H. Naylor, who was selected for training under the Young Pilots' Fund Scheme. Mr. Edgar Taylor, of the Aviation Group, has now passed his "A" licence tests. Dr. and Mrs. A. A. D. La Touche plan to leave Yeadon this week in their "Gipsy Moth" for the Austrian Rally. Another member, Mr. F. E. Rhodes, with his wife and F/O. Moody, one of the club's instructors, will also be leaving shortly for a tour of Europe in the club's "Puss Moth"

MIDLAND

During last week the flying time put in by the Midland Aero Club totalled 33 hr. 40 min., and two members joined—Messrs. L. Cox and F. G. Averill. Visitors to Castle Bromwich included Air Commodore Chamier, in the King's Cup Monospar, and Sir Alan Cobham. Cross-country flights were made to Witney, Walsall and Hooton.

AUTOGIRO

Two first Autogiro solos were made last week by Mr. N. K. Dubash and Mr. H. Belart, and the total flying time at the Autogiro School was 76 hr. 15 min. Three new pupils joined—Mr. E. Holland-Martin, Mr. Shae-Simonds, and Herr Berendt, who is the chief instructor of the Austrian Aero Club, and who is taking an intensive course.

CINQUE PORTS

All the club's machines were flown in formation to the Brooklands "At Home" on Saturday, and returned to Lympne the same evening. During the week Mr. Charles Fane passed his "A" tests, and Messrs. H. E. Bingham and T. C. H. Pearson, of the Small Arms School at Hythe, made first solos. The weather has been very much better, and the flying time amounted to 50 hr. 35 min. Miss Margaret Cunnison will shortly be qualifying for her "B" licence, and has been taking a blind flying course at Brooklands.

LEEMING

More than 174 hours were flown by the Yorkshire Aviation Services School last month, and this figure shows an increase of more than 90 hours over last year. One "A" licence was obtained during the month, and several pupils are reaching their licence stage. New pupils include Capt. Bruce-Norton and Messrs. Wilson, Kettlewell, Bulfin, Sieger, Hobbes, Garforth and Hodges.

An agreement has now been provisionally reached between York Corporation and Y.A.S., and the school hopes that a municipal aerodrome will be open for instruction, sales and service in the early part of next year.

TOLLERTON

During last week the flying time of the Tollerton Aero Club was 38 hr. 23 min., and nine new associate members joined the club. The aerodrome was open to the public on Empire Air Day, and the club was honoured during the afternoon by visits from the Lord Mayor and Lady Mayoress of Nottingham, the Sheriff and Mrs. Binch, and Sir Albert Ball. In spite of strong winds some 400 people were given joy-rides. As already reported in *Flight*, Railway Air Services are now starting one of their lines from Tollerton.

HATFIELD

During last week the flying time at the London Aeroplane Club was 101 hr. 15 min., and Miss Clowes made her first solo flight. Four new members joined—Messrs. J. A. Marks, E. Rew, J. Paterson, and W. Goldsmith. The second "Comet" for the French Air Ministry, which is now undergoing high altitude consumption tests, may be seen at the Garden Party on Saturday. The works, incidentally, received orders for no fewer than eighteen machines and nineteen engines last week.

There has already been a heavy demand for tickets for the Royal Air Force Flying Club Display to be held on June 15, and certain final details of the organisation form the subject of a discussion amongst members of the Display Committee at a luncheon given in London by Sir Harry Brittain. F/O. R. W. Burkitt and P/O. J. A. Tinne have become members.

DUBLIN

During the past month two excellent performances have been put up by Dublin Air Ferries. The first was that the four machines flew 86 hr. 45 min., and the second was that during the past seven weeks thirteen first soloists have been successfully sent off. These figures include four women members, Miss Kathleen Wilson, Miss Beattie, Miss Bayley Butler, and Miss Scannell. There were actually more soloists sent off than in any whole year before in any part of Ireland.

On May 22 Mr. Robert Little took his "A" licence at Baldonnell aerodrome. He is now doing strenuous cross-country flights before buying his aeroplane to return to Manila *via* China. A number of charter flights have been carried out during the month, including ones to Sligo, to Birmingham, and to Galway for fishing.

An "At Home" is being held at Kildonan aerodrome on Whit Sunday, June 9, and a pageant is being arranged for the early part of July.

Private Flying

REDHILL

The Redhill Flying Club is very busy indeed nowadays. During last week 99 hr. 30 min. were put in on club machines, ten new flying members joined, and four members obtained "A" licences. Mr. Robinson finished his blind flying course, and among several cross-countries made were ones to Cardiff, Yeovil and Barnstaple. The "Puss Moth" has now returned from its C. of A. overhaul.

LEICESTERSHIRE

Two new members joined the Leicestershire Aero Club last week—Messrs. L. F. Partridge and A. A. Gordon Cranmer. The latter has joined under the Air League Scheme. Mr. A. Codling obtained his "A" licence, and the club flew 29¼ hours during the week.

The club has been provisionally approved by the Air Ministry for instrument flying.

HANWORTH AGAIN

The Hanworth Country Club, Extended and Improved, is Officially Reopened

AS Capt. Guest intimated in his opening speech, Hanworth has had a chequered career. National Flying Services, the original owners and the concern which developed both the aerodrome and the club, arrived perhaps a little before its time, but it is to be hoped that the new Hanworth will have a more prosperous future.

Under the new scheme Hanworth will be primarily a modern country club, with the best of facilities for recreation and with flying as a strong additional attraction. Judging from the number of people, including many of the original members, who were present at the reopening ceremony, the new venture is likely to be a success.

After the official luncheon and opening by Capt. Guest, a very thorough series of demonstrations and competitions were staged for the afternoon's entertainment. There were two handicap races, one for "A" licence pilots and another for "B" pilots or for private pilots with more than 300 hours in their log-books. Both provided exciting finishes, which were tributes to the handicapping—though in each race the pilot first past the winning post was disqualified for failure to make a correct turn at one of the points.

The first race was actually won by Mr. Hugesden ("Cirrus III Moth"), with Mr. Moore ("Gipsy Moth") second, and with Mr. Tweddle ("Martlet"), who was very nearly overhauled by Capt. Duncanson in the Hendy "Hobo," third. The second race, won in spirit by Capt. Duncanson in the Hendy "Heck," was won in fact by Mr. Wood in the "Hobo." Mr. Bickerton was second with a "Hawk Major," and Mr. Smith third with the King's Cup Monospar S.T.10.

A "Concours d'Elegance," judged by Capt. T. N. Stack, was very suitably won by the Duchess of Bedford's "Puss Moth" with Sir Derwent Hall Caine's "Leopard" second in the cabin class. The "Gipsy I Moth" owned by Mr. Moore won the open-type class after taking second place in the first race. The Duchess of Bedford, incidentally, presented the prizes.

The many demonstrations did not pass off quite without incident. Mr. de Greeuw misjudged the wind speed when making his drop with the G.Q. parachute and eventually landed in the "island," missing the clubhouse and the trees by a few feet. While Capt. Duncanson was demonstrating the "Hobo" its engine stopped in a steep stalled turn, and the gathered multitude watched an excellent aerodrome forced landing. Finally Mr. E. D. Ayre, now with Radio Transmission Equipment, showed us all exactly how the B.A.C. "Drone" could be "crazy-flown" around an aerodrome.

A good afternoon, in fact, in which everybody, once again, had a chance of meeting everybody else.

The Bombay Flight Plans

In spite of the fact that two of their aeroplanes have been recently written-off in accidents, the Bombay Flying Club have proceeded with their plans for an instructional flight to England on the same lines as the one so successfully led by the late Flt. Lt. K. H. Binley last year. When the number of the club's aeroplanes available for the flight was so reduced to three it was decided to buy another. The flight started last week-end.

The route this time will be through Turkey instead of Egypt and South Italy. Mr. Gazdar, the pilot-instructor of the club, is in charge of the flight.

Next Saturday at Hatfield

The London Aeroplane Club, which was one of the first to be founded, is holding its annual garden party at Hatfield aerodrome next Saturday. This club was founded in 1925, and this year's party will therefore form the tenth anniversary of the club, and a more ambitious programme than any previous year has been arranged for the day.

Tickets for the garden party will be 5s. for visitors and 4s. for members, which includes entrance, tea and the use of the swimming pool and restaurant. An informal dinner and dance will follow in the evening at 8 p.m. For the convenience of members and guests the clubhouse and bar will remain open all day until midnight.

Incidentally, 3,300 hours were flown during 1934 and 43 "A" licences were obtained at the London Club.

Lightweight Radio for Private Owners

THE Midget Transreceiver radio equipment, which was demonstrated again at the Brooklands Garden Party, may certainly revolutionise our ideas of what the private owner may or may not do with wireless. Working as it does on a five-metre wavelength and over a comparatively small range, this equipment would not interfere with the earnest work of the airline pilots, yet would enable the private owner to get into touch with his own and other club aerodromes.

Weighing less than 15 lb. complete, the Transreceiver—which is made by Ideal Transreceivers, Ltd., of 444, Ewell Road, Surbiton—is, of course, a self-contained transmitter and receiver which will work satisfactorily over distances between ten and forty-five miles, according to the circumstances and to the installation.

At Brooklands we had a chance of trying this equipment, and found no difficulty in following the conversations of either of the two ground stations. Those in the Brooklands Aero Club hangar, of course, listened to a gramophone record being played in a machine over Redhill, the sound being amplified by the Phillips installation used at the party. A single tuning dial is used and the change-over from reception to transmission is made by means of a single switch. The very short rigid aerials can very easily be accommodated in a light aeroplane.

The Second Magyar Picnic

The Automobile Association and the Royal Aero Club have again been asked by the Hungarian Touring Club to assist in the organisation of a Hungarian air picnic (Magyar Pilota picnic) to be held from July 13 to 18. Pilots and owners of aircraft who wish to take part are invited to send their names to the A.A. or R.Ae.C. before June 13.

The pilots are asked to arrive at Matyasfold aerodrome, Budapest, between 12.00 and 14.00 on July 13. The tour of Hungary will begin next morning, and visitors will fly to Mezokövesd. After lunch the flight will continue to Hortobágy—the Wild West of Hungary—where great herds of cattle are pastured on the open steppes. A short flight to Debrecen will conclude the day.

On Monday the party will leave for Mezohegyes, the largest national estate in the country. The night will be spent at Szeged. On Tuesday a flight will be made to Siofok, the famous Hungarian pleasure resort, and visitors leave for Budapest in the evening. The two final days are spent in Budapest, where an attractive programme has been arranged, and the picnic will conclude with an informal farewell dinner.

The inclusive fee charged will be 180 pengoes per head. This fee, which is payable at Budapest, covers hotel accommodation, food, tips and local transport between aerodromes and towns except on arrival at Matyasfold. Holders of air touring cards may make use of the touring cheques of the Magyar Touring Club, obtainable at the A.A.

Hungary is one of the most picturesque countries in Europe, and this expedition will provide a unique opportunity for the little known and happily unspoilt interior of the country to be visited under ideal conditions.

HERE AND THERE

R.A.F. Display News : The "Hornet Moth" : Reconnaissance Tests in the Circuit of Germany

The "Comet" at the R.A.F. Display

AMONG the 200 aircraft which will participate in the Sixteenth Royal Air Force Display at Hendon on June 29 will be the D.H. "Comet" which won the England-Australia air race last October. It has since been purchased by the Air Ministry for experimental and research work, and now carries Service markings. It will be flown by a Martlesham pilot.

The first event in the main programme will be a demonstration of air drill by Nos. 15, 18, and 57 (Light Bomber) Squadrons from Upper Heyford. These machines, which are "Harts," will take off simultaneously with the arrival of the members of the Royal Family attending the Display. A rehearsal of this item took place at Heyford last Friday. A *Flight* representative who was present writes that the "Harts" will make one circuit in squadron formation, and a second with No. 15 in "echelon port," No. 18 in vee, and No. 57 in "echelon starboard"; a third circuit will be made with No. 15 in line astern, No. 18 in "echelon port," and No. 57 in vee; on the final circuit all three squadrons will dive past the Royal enclosure.

Advance booking can be made with the Secretary, Royal Air Force Display, Hendon, Colindale 8242, and from all theatre and ticket agencies in London and the provinces. Tickets may also be obtained from any R.A.F. station. Boxes, which seat six, are on sale at £4, £5 and £7. Tickets for the main enclosures are priced 10s. and 5s.; with reserved seats in the stands in these enclosures at 3s. and 2s. 6d. extra.

An innovation is being made this year in providing a stand with reserved seats in the 2s. North (Watford Way) enclosure. Parties of twenty (or more) wishing to have seats in this stand can book for the 2s. enclosure in advance at an inclusive charge of 4s. 6d. per person.

Exit "Moth": Enter "Hornet"

That the open-cockpit "Moth," for private owners and civilian use, will no longer be manufactured is announced by the De Havilland Aircraft Co., Ltd. The only open type of "Moth" to remain in production will be the "Tiger Moth," which is not greatly in private demand but is used by sixteen Governments for training purposes. The decision to discontinue the "Moth" has been taken after a period of ten years, during which something like 4,000 machines of this type have been sold to all parts of the world.

No official announcement has yet been made by the company as to the replacement type of "Moth," but it is known that the "Hornet Moth," with side-by-side seating in an enclosed cabin, is shortly to be presented to the world as a machine intended for school, club, and private work. Capt. G. de Havilland has personally supervised every step in the evolution of the "Hornet," from the initial conception to the final appearance of the machine.

Pilots who have flown the "Hornet" are enthusiastic about its ease of handling, and a feature is that the controls have been so well harmonised that the rudder virtually becomes a ground control only. The "Hornet" can be taken off, flown through all normal manœuvres and landed, without the use of the rudder. The performance will be superior to that of the "Moth," but quick take-off and good landing characteristics have not been sacrificed.

Full particulars of the de Havilland "Hornet Moth" may not be published for the present, but it can be said that the machine is a biplane with the style of tapered wings which has characterised recent D.H. machines. Needless to say, the wings fold for storage. Elaborate arrangements have been made for quantity production, a special equipment of tools, jigs and plant having been prepared.

In spending a whole year on getting the "Hornet" into production (the first machine took part in the King's Cup Race last year), and taking particular care over the accuracy of manufacture, the firm has almost certainly ensured future owners freedom from trouble. It is understood that orders on hand will keep the firm busy until well into the autumn, but "Hornets" will be produced at whatever rate is necessary to meet the demand. The price will probably be in the neighbourhood of £900.

NON-STOP TO BUCHAREST is the aim of Mlle. Braescu, who is to leave Croydon in the near future in a special Miles "Hawk Major" ("Gipsy Major"). The machine, which is named *Aurel Vlaicu* after the first Rumanian pilot, is a single-seater with coupé top, and is equipped to carry 100 gallons of fuel, giving a range of 1,500 miles. (*Flight* photograph.)

"Rapier VI" Passes 100-hour Test

The Napier "Rapier VI," the latest and most powerful version of the "Rapier" sixteen-cylinder H-type engine, which was described in *Flight* of March 14, recently completed its 100-hours' Service type test satisfactorily, and the makers disclose that the following figures were obtained and have been officially certified:—

RATED POWER: 345/360 b.h.p. at 3,500 r.p.m., 4,000ft. and + 2½ lb. sq. in. boost.
MAXIMUM POWER: 380/395 b.h.p. at 4,000 r.p.m., 5,800ft. and + 2½ lb./sq. in. boost.
TAKE-OFF BOOST POWER: 350/335 b.h.p. at 3,500 r.p.m. and + 3½ lb./sq. in. boost at sea-level.
FUEL CONSUMPTION: (D.T.D.230) at 310 h.p. and 3,500 r.p.m.: 0.58 pt h.p. hr.
OIL CONSUMPTION: (D.T.D.109) at 3,500 r.p.m.: 6 to 10 pts./hr.

It is stated that the condition of the engine on dismantling was excellent.

Wooden-bladed Airscrews

Many readers of *Flight* will be aware that for some considerable time the Airscrew Company, of Weybridge, has held the British rights for the manufacture of wooden airscrews with a cellulose covering. The originators of the scheme are the Schwartz Propeller Company, of Germany, and airscrews manufactured under the patents are rapidly gaining popularity owing to their robustness and long life. The cellulose coating of the blades and hub is forced through the woven fabric base into the wood underneath under great pressure and forms a coating which, in addition to protecting the surface of the airscrew, reinforces the natural strength of the wood.

The Airscrew Company has now made arrangements for going a step farther and extending the scheme to the manufacture of wooden blades for controllable-pitch airscrews. This latest process of the Schwartz Company consists of impregnating the blade roots with a special material and securing them in suitable sleeves. The action is to increase the natural shear strength of the wood approximately three times.

Many attempts have been made to devise means for attaching wooden blades to the metal hub of variable-pitch airscrews, but they have failed mostly on account of the relatively low shear strength of wood. Inventors and de-

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signers have tried to get over the difficulty by designing forms of attachment in which the shear area was increased, but none of the attempts has met with full success.

It would appear that the new method overcomes all difficulties previously encountered in effecting the mechanical combination. At any rate, the Schwartz C.P. airscrew has obtained its certificate of airworthiness in Germany, and is in quantity production there. Four types are to be tested in this country in the near future, and there seems to be no reason to think that the airscrews will not work as satisfactorily on British as on German engines.

The use of wooden blades on a C.P. airscrew should bring very considerable advantages. It is not that the blades in themselves are startlingly lighter than corresponding blades in metal; probably the relative weights of the wooden blades is something over 50 per cent. But, as the bulk of the wooden blades lies only a short distance out from the hub, the centrifugal force is probably only about one-third of that of a metal blade, so that, apart from the saving of weight on the blade itself, there should be a very great saving on the weight of the hub.

It is, of course, obvious that the more weight can be saved on a wooden-bladed C.P. airscrew the lower the pitch-diameter ratio at which the C.P. airscrew becomes worth adopting, so that many aircraft on which C.P. airscrews of the weights common to-day would scarcely be worth while would come into the C.P. category.

It is understood that the Airscrew Company does not intend to start the manufacture of C.P. hubs, holding the view, with which we agree, that this is the engine designer's proper care. The company will produce the wooden blades, in close collaboration with the designer of the hub, leaving him free to use any system of operation which he prefers, either a two-position hub or an infinitely variable pitch hub.

The results of the four tests to be made with wooden-bladed C.P. airscrews in this country will be watched with the keenest interest and may well be found to mark the beginning of quite a wide adoption of this particular aid to efficiency.

Monoplane as Heroine

"Henrietta." By Charles Lorne. (Peter Davies, Ltd., London. 7s. 6d. net.)

Writers of novels or short stories in which the characters are exclusively involved in some highly technical job or other are in an extremely difficult position. If they please the technicians they fail to please the public—and *vice versa*. American writers usually manage to carry it off, and it is unusual to read an American story about flying or oil prospecting or cowpunching in which the author does not give an impression of having a thorough grasp of his subject—without boring his readers.

The author of "Henrietta" has carried off a difficult subject well. The story is exclusively centred round a cabin monoplane, and the characters appear and disappear without explanation or apology. Yet the reader is sufficiently gripped by the main subject to be almost indifferent to the fate of the mere humans who successively own the machine. The suggestion that the monoplane is in partial control of every situation is, perhaps, a trifle overdone, but it is difficult to see how Mr. Lorne could have handled the situation without this little conceit to assist him. H. A. T.

FOR THE KING'S CUP. In the maker's works at Reading this racing "Hawk Major" two-seater is nearing completion. Fitted with a boosted "Gipsy Major" giving 146 h.p., it will be flown by Mr. Cook, who competed in last year's event on a "Gipsy Swift." The new machine has a coupé top which gives it exceptionally good lines, and it should do well. (*Flight* photograph.)

Reconnaissance Tests in Deutschlandflug

TEAM work rather than individual performances was again aimed at in the Deutschlandflug (Circuit of Germany) this year. Organised by the Deutsche Luftsport-Verband, the contest started and finished at Tempelhof aerodrome, Berlin. During the period May 27-June 2 the competitors had to cover a circuit of Germany totalling 5,534 km. (3,435 miles), and points were awarded for reporting accurately the location of certain marks laid out on the ground, large gatherings of people, troops on the march, large convoys of motor cars, and so forth. Failure to report these accurately was penalised by the loss of points. For the rest, the award of points was based upon the maintenance of certain average speeds, higher speeds for small squadrons and lower speeds for large squadrons. If a squadron lost a machine it was not disqualified, but had to increase its speed to that corresponding to its reduced size.

Thirty squadrons, totalling 154 aeroplanes (reports *Flight*'s Berlin correspondent), started from Tempelhof. The squadrons were composed as follows: 6 of 3 aeroplanes each, 2 of 4 each, 16 of 5 each, 3 of 7 each, and 3 of 9 each. During the circuit 31 compulsory landings had to be made and 35 turning points had to be rounded. The stops at night were at Guben, Koenigsberg, Bremen, Freiburg and Erfurt.

On the first day two machines fell out, and on the second

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

June 1-15. Lisbon Aero Show.
June 7-11. Whitsun Flight through Austria, Oesterreichischer Aero Club.
June 8. London Aeroplane Club. Garden Party, Hatfield.
June 8. Official opening and garden party. Witney and Oxford Aero Club.
June 15. R.A.F. Flying Club Annual Display, Hatfield.
June 15. Bristol and Wessex Aeroplane Club S.B.A.C. Challenge Cup, Whitchurch.
June 16. Scottish Flying Club Display, Renfrew.
June 29. Royal Air Force Display, Hendon.
July 1. S.B.A.C. Display, Hendon.
July 6. Royal Air Force Fly-past before H.M. the King at Duxford.
July 7. Douze Heures D'Angers, Aero Club de France
July 13. Opening of Leicester Municipal Airport.
July 20 Opening of Brighton, Hove and Worthing Municipal Airport, Shoreham.
July 20-21. Coupe Armand Esders, Aero Club de France.
July 27. London-Newcastle Race, Newcastle Aero Club.
July 28. Private Owners' Garden Party, Ratcliffe, Leicester.
Aug. 17. Round the Isle of Wight Air Race and Portsmouth Air Trophy.
Aug. 24-25. Third International Flying Meeting, Lympne.
Aug. 24-25. Cinque Ports Club. International Flying Meeting and Wakefield Cup Race.
Aug. 24-30. Raduno del Littorio. Rome. Reale Aero Club d'Italia.
Sept. 4-18. Jungfraujoch Concours Aero Club de Suisse.
Sept. 6-7. King's Cup Air Race.
Sept. 14. Cinque Ports Club. Folkestone Aero Trophy Race
Sept. 15. Gordon Bennett Balloon Race, Warsaw.
Oct. 12-28 International Aircraft Exhibition Milan.

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day the total number had been reduced to 147, forming 29 squadrons. On the third day four more machines dropped out owing to forced landings. The fourth day saw the competitors in South Germany in very bad weather, with another three machines out of the contest. On the fifth day the number left was 139 machines. One more machine fell out on the sixth and last day, so that 29 squadrons, totalling 138 machines, finished at Tempelhof.

The winners were the Klemm squadron of the Fliegerortsgruppe, Danzig, who took the lead on the fourth day and kept it to the end. The aircraft types taking part were Fieseler and Klemm low-wing monoplanes, and Adler, Arado, Focke-Wulf and Heinkel biplanes. The engines fitted were Argus, Hirth and Siemens.

The R.A.F. Flying Club

"IT is good for young men to have flying experience on aeroplanes without service equipment." This was the view expressed by Lord Trenchard, Marshal of the Royal Air Force, speaking at a luncheon last Monday in connection with the Annual Display of the R.A.F. Flying Club, to be held at Hatfield on June 15. He stressed the value to young officers of club life and the benefits of the club to the R.A.F. "If," Lord Trenchard said, "you can make your duty also a pleasure, so much the better."

The Secretary of State for Air, Lord Londonderry, paid a high tribute to the work of Lord Trenchard in organising the R.A.F., and recalled that when the club was formed its title was the R.A.F. Reserve Flying Club. The enthusiasm was however, so great that the activities of the club had to be enlarged, and the title was changed to the present one. Now all past and present officers of the R.A.F., the A.A.F., the R.A.F.O., the Special Reserve, the British Empire Military Flying Service, the R.N.A.S., the R.F.C. and members of the University Air Squadrons were admitted to membership. With its new and wider scope the club would strengthen the bond of union which linked past and present serving officers.

"Linton Hope" Hulls

In the article "The Early Days," in *Flight* of May 23, it was stated that at the Olympia Aero Show of 1914 Mr. Pemberton Billing exhibited a flying boat which "foreshadowed yet another 'family' of flying boats, the Linton Hope type." Mr. Hubert Scott-Paine now points out that he (Mr. Scott-Paine) was responsible for the idea and afterwards for the major part of the constructional details. Mr. Linton Hope did not come into flying boat design until the war period, while the "P.B.1" was designed and built in 1913-1914. The first boat of "circular" construction, and with which Linton Hope had anything to do, was laid down by Mr. Scott-Paine at the Supermarine works, Mr. Linton Hope consolidating the lines, etc., at the Admiralty and re-issuing them as working drawings after the hull was in frame.

We are glad of the opportunity to be able to make the position clear; actually what we meant to convey was that the early Supermarine "P.B.1" flying boat was the first round-hull, stepped type, and that later on this type became commonly referred to among flying boat folk as a "Linton Hope type."

THE MODERN TRANSPORT MACHINE

The Twenty-third Wilbur Wright Memorial Lecture : Mr. Donald W. Douglas at the Royal Aeronautical Society's Annual Conversazione

ALTHOUGH Mr. Douglas's subject for the Wilbur Wright Memorial Lecture covered the development and reliability of the multi-engined commercial machine, his paper, as originally planned, was of such stern stuff that the Society recommended him to deliver a rather less erudite lecture on the actual occasion. This is, of course, essentially a social affair attended by designers *and* their wives.

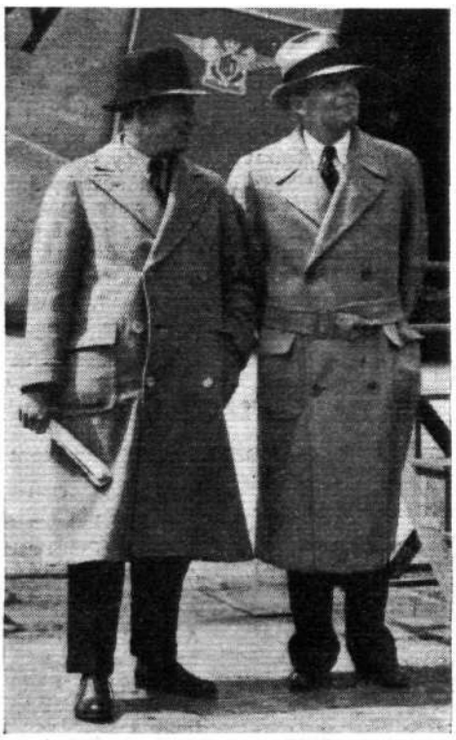
His final paper dealt rather with the present Douglas D.C.2 and with comparable modern types, and was accompanied by a film presentation in which the progress from the first of the modern American types to the present machine was shown in a very instructive manner. Lt. Col. J. T. C. Moore-Brabazon, M.P., was in the chair.

American air transport history, said Mr. Douglas, really started in 1926 with the Post Office contracts. At that time the Fokker and the Ford were the most suitable types for general operation over the Continent. The modern type was the direct result of technical co-operation, and was made possible by such developments as the controllable pitch airscrew. The Boeing 247, used by United Air Lines, was the first, and Transcontinental and Western Air then enlisted his help, with the result that the D.C.2 was designed and made. This machine was designed so that it would definitely fly on full load with one engine at more than 8,000ft.

After running through the features of other modern American transport machines, including the boats, Mr. Douglas gave some interesting figures showing how air transport had developed both in value and safety. Slow landing devices, he said, would develop, but all the icing problems must be solved and protection against the effect of electrical storms must be ensured.

He concluded his talk with the statement of a hope that nations would co-operate in air development, and that military aviation would not take the available technical ability.

Lt. Col. Moore-Brabazon then asked Mr. C. R. Fairey to propose a vote of thanks. There were, he said, three separate entertainments: the technical paper to be read in bed; the film which ought to be shown again; and Mr. Douglas's general comments. Mr. Fairey thanked Mr. Douglas for a practical talk and an important lecture.



Mr. Donald W. Douglas (right), who delivered the Wilbur Wright Lecture, photographed with Mr. Anthony Fokker, the famous designer, shortly after his arrival in England.

In the original paper Mr. Douglas explained that the most frequent cause of accident was the forced landing, and that a multi-engined aeroplane was not desirable unless it could maintain operating height with one engine out of commission. The operating height on the Transcontinental routes, of course, is the lowest by which a passage over the Rocky Mountains can be made.

The twin-engined type, he claims, offers at present a valuable combination of safety and economy because the drag, weight and cost increased with a greater number of engines. Safety is largely a matter of design, and Mr. Douglas dealt in detail with the various conditions, including those affecting rudder control, enabling safe flight to be maintained after engine failure. The four-engined type, capable of maintaining height with two engines out of action, would, he thought, be the future type.

Before the lecture the annual dinner of the council was held, and this was attended by Lord Londonderry, Mr. Griffith Brewer, Air Marshal Sir Hugh Dowding, Sir Joseph Petavel, Sir Robert McLean, Lord Gorell, Colonel E. E. B. Mackintosh, Captain M. J. B. Davy, Captain F. E. Guest, Professor W. Thornton, Mr. C. H. Colvin, Lieutenant-Commander L. C. Stevens, Major B. F. S. Baden-Powell, Mr. Anthony Fokker, and Mr. T. A. Morgan.

The various medals of the year were also distributed before the lecture.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

IN THE FLOODLIGHTS : This photograph, taken by a *Flight* photographer at Heston during the Household Brigade display, gives some idea of the value of modern floodlighting equipment. Those at Heston, of course, are of Chance manufacture, and the machine is an Airspeed "Envoy"

NIGHT INTO DAY

Heston's New Floodlighting System Demonstrated : The System from the Pilot's Angle

NOW that Heston has developed into an important air line centre the need for really adequate night lighting would have been strongly felt before the opening of the winter season. For some years, of course, Heston has been equipped with a single Chance-Airwork shadow-bar floodlight of about a million candle-power, but now three Chance floodlights, each of 1½ million candle-power, have been installed on the north-western, southern, and eastern boundaries of the aerodrome.

These floodlights can be operated from the control tower, different pairs being used, of course, according to the direction of the wind. Each floodlight consists of three units, and the angle of dispersion is about 120 degrees. Two of them are at ground level and are of the "exposed" type, adjustments of the lamps and mirrors being effected through a door, while the third, mounted on the roof of the traffic office, is entirely enclosed in a Laminoid housing. As described in *Flight* of April 4, this type allows an attendant to work under cover, and separate interior lighting is provided. The "exposed" floodlights are mounted on curved tracks, enabling them to be moved through a horizontal angle of 60 degrees. Each has a range of 2,800 ft., and at that distance gives an illumination of the order of 0.2 foot-candles.

Marking the Boundary

The new Chance boundary lights, which have an amber light surmounting an illuminated pillar, convey perspective to the pilot and are distinguishable from other lights in the vicinity by the fact that they dim at roughly two-second intervals.

At the demonstration on Tuesday of last week two types of obstruction lights were also shown. One, the Haig, is portable and self-contained, and the illumination is provided by a spiral neon tube. The other is for permanent use and has a switch circuit arranged so that if one of the two bulbs fails the other immediately comes on. Both types are handled by Chance Brothers.

After the dinner, at which Mr. Walter Chance presided, and at which most of the leading aeronautical people were present, there was an opportunity of seeing the equipment from the air. A "Puss Moth" and a Monospar S.T. 10—actually last year's King's Cup winner—were making continuous landing circuits at midnight and afterwards.

From the front seat of the Monospar, which was piloted by Mr. Seth Smith, it was possible to keep Heston in view during the entire flight and to judge the value of the boundary lighting system. Although the Heston district is fairly well spangled with neon signs and coloured lights of all descriptions, the periodically dimming boundary lights would have been easily distinguished without the help of the floodlit area as a guide.

During the final "rumbling" approach their stalks gave a very good idea of both height and distance. The actual landing struck one as being almost as simple a matter as any carried out by daylight, though the shadows of the surface undulations would cause any pilot inexperienced in night flying to hold off rather on the high side. There is no doubt that modern floodlighting has turned night into day, and one feels that the belated private owner would have little difficulty in pulling off an emergency night landing at Heston with its new equipment. His approach might be very ragged, but he would have little difficulty with the final touch down on the lighted area.

Alternative Airports.

During the past year several references have been made to the company controlling Gatwick and Gravesend, and to the work being done at these aerodromes. This company has now been made public and prospectuses for ordinary shares will be available to-morrow.

Both Gatwick and Gravesend are to be fully equipped for night landings, and Gatwick will probably have a short-range radio beacon before next year. These aerodromes, of course, can now be considered as the official alternatives to Croydon in conditions of really bad visibility. K.L.M. and D.L.H. are already using Gravesend.

Commercial Aviation

THE WEEK AT CROYDON

The Ill Wind—and the Beneficiaries : Week-end Bookings : Around the Schools : Major Richard Leaves

ON Tuesday and Wednesday of last week Imperial Airways and Air France brought some nine tons of gold from Paris. Air France had a special Fokker F7.b on the job, and Imperial used the Boulton Paul *Britomart* as a bullion special. All scheduled aeroplanes of both companies carried bullion. One H.P.42 machine carried a ton of gold and sixteen passengers! Various French passengers were seen wandering about in the Customs with large ingots wrapped in bits of newspaper.

Week-end bookings on all routes appear to be increasing. Imperial Airways, Sabena and Swissair report machines full to capacity, and M. Bouderie, of Air France, says that long-distance booking to Marseilles, Algiers, and so forth are phenomenal. K.L.M., which carries more business travellers and fewer pleasure tourists—and this applies to D.L.H. also—has been comfortably full on all recent week-end services. Figures at the end of the month of May show that 12,500 passengers passed through the airport of London. This is a record for any month.

One of the earliest inhabitants of the airport, Capt. Muir, who was flying in the early days for Surrey Flying Services—which is, incidentally, the oldest taxi and pleasure flying firm on the aerodrome, if not in England—and who was subsequently a director of that firm, returned to Croydon last week for a brief visit. He arrived with a Spartan "Cruiser," the property of the Maharaja of Patiala. Capt. Muir flew a machine out to India some years ago for delivery to the Maharaja—and stayed there. He is now chief pilot and State engineer, having roads and railways as well as air transport under his charge.

Mrs. Horsham, who arrived by Imperials from India, has no faith in ground transport, and literally flew from door to door. She arrived at the airport of departure in India in an aeroplane, and on arrival here she took a Wrightways air taxi to Frinton.

Mr. "Bill" Ledlie, of Olley Air Service, had an unusual job recently. He flew a school inspector in a "Fox Moth" around England to a variety of schools at such places as Rhyl, Giggleswick (Yorks), Rochester, Malvern, Cheltenham, Oxford, Oundle, Bedford, Cambridge, Canterbury, Tonbridge, and Epsom.

A curious way of looking at the matter of dizziness whilst flying—which, of course, does not occur at all because there is no direct contact with earth—was recently shown by a lady passenger. She could not believe she would not suffer the same sensations in an aeroplane as when looking down from a tall tower or cliff top, and decided to make a night flight over London as her "air baptism." At night, she felt, she would not be troubled by the effects of height.

On Friday there was an informal meeting at the aerodrome hotel when Mr. Wolley-Dod, of Imperial Airways, Capt. Leverton, of K.L.M., M. Bouderie, of Air France, Mr. Schmidt-Rex, of D.L.H., and Mr. McDonald, of Surrey Flying Services, were present. M. Jonkheer, of Sabena, was on the way to Brussels by air and could not attend. The occasion was the last day of Major Richard's appearance amongst us as chief aerodrome officer. A silver tankard, inscribed with the names of the companies concerned, was presented to him, and Mr. Wolley-Dod said a few well-chosen words expressing the very real regret felt at the loss of a very popular chief aerodrome officer.

"Flying to the common danger" is a crime for which there should be severe penalties, not only on paper, but in actual fact. A serious collision between a private owner and a big commercial machine was narrowly averted recently. The private owner was coming in to land without, it is alleged, conforming to the regulations, and the commercial machine was taking off after receiving the signal from the Control Tower. The commercial aeroplane had some dozen people aboard, and there is nothing amusing in the contemplation of what might have happened. The time has come for the authorities to take a definite line of action in such cases. "A. VIATOR."

Around the Islands

Within a few days—possibly by the time *Flight* appears this week—Jersey Airways will be operating a service between Jersey and Guernsey, using a Saunders-Roe "Windhover." This amphibian is already in action, and Mr. Eckersley-Maslin, the chief pilot, has been putting in a lot of hours with it around the island.

The company should have its sixth D.H.86 very shortly.

British Continental Plans

The new Croydon company, British Continental Airways, brief details of which were given in *Flight* of May 23, has now settled most of its plans for the summer.

On July 1 it hopes to open a daily service to Ostend and Le Zoute and a week-end service to Brussels. The Ostend service will be run three times daily except on Sunday, when a single return journey will be made. The Brussels machine will leave on Saturday and return on Monday.

The company is expecting its second "Rapide" this week, and the third will be delivered in time for the opening services. In addition to Messrs. Morton and Hattersley, Mr. J. D. Bredenkamp has been engaged and there will be two more later. The machines, of course, will carry radio operators.

Short-wave Research

The National Physical Laboratory is starting a three-year programme of radio research with particular reference to short and ultra-short waves for beacon work. The Vickers "Viastre" previously owned by the Prince of Wales will be placed at the disposal of the N.P.L. for these experiments.

Out of Hatfield

Railway Air Services took delivery last week of the fourth of a series of new machines comprising two "Dragons" and two "Rapides." On Thursday Mr. Parkes, the technical director of Airwork, flew over to Hatfield in a Short "Scion" to take delivery of a D.H.86 destined for Misr Airwork. This machine will be, or has been, flown out this week, and has the cabin notices in English, French and Arabic.

A Time-table Anniversary

Martineau's Airway Time-Table, which was the first airway time-table to be published, is now entering on its second year. Since June of last year the internal air map has become very much more crowded, and it is interesting to notice the progress made.

in East Africa

Wilson Airways, who work in close collaboration with Imperial Airways, are now operating a weekly service in both directions between Nairobi and Mwanza, and serving Lolgorien, Watende Mines, Lathbury's Mine and Musoma. This service provides connections with both the north and southbound intermediate Africa services at Nairobi, a machine leaving Nairobi at 6 a.m. on Saturday and leaving Mwanza at 2 p.m. on Sunday.

Australian Feeder Lines

The service between Sydney and Canberra, operated by Eastern Air Transport, Ltd., has now been satisfactorily established, and is being fairly well patronised. One return trip is made on Tuesday, Wednesday, Thursday and Saturday, with two trips on Monday and Friday. The run takes a little over an hour, and an extension to Tumut is made when necessary.

The company has acquired the business of Kingsford Smith Air Service, Ltd., and Sir Charles has joined the board. Mr. D. F. Collins is manager.

Western and Southern Provincial Air Lines, Ltd., have started a service from Sydney to Narromine and Nyngan, running three days a week. The Kingsford Smith flying school is doing record business, and two instructors, T. Pethybridge and G. Henry, are permanently employed, with D. F. Collins and R. F. Chapman assisting when required. Chapman, incidentally, is doing most of the flying on the Canberra run.

Sir Charles, by the way, has been in New Zealand, where he has been attempting to arrange a mail service across the Tasman Sea, using two Douglas D.C.2 machines. In the meantime he has joined the board of the company operating between Auckland and Dunedin.

Commercial Aviation

Soviet-Czech Air Line

An agreement between the U.S.S.R. and the Republic of Czechoslovakia to establish regular air services between the capitals of the two countries was recently signed in Moscow by representatives of both sides.

Italy in Egypt

Arrangements have been reached whereby Italian air line machines may fly across Egyptian territory on their way to Italian Somaliland. At present the agreement extends for six months, but it is hoped that a longer agreement will be negotiated in time.

A Study of World Air Transport

The Deputy-Director of Public Works, Straits Settlements, Mr. R. L. Nunn, D.S.O., made a rapid tour of the world's air routes last year, and his impressions and conclusions have been published in pamphlet form. This book, entitled "A Report on Civil Aviation," is well illustrated with photographs taken by the author, and will be a most useful reference work to all who are connected with the business of air transport.

Mr. Nunn travelled from Singapore to Vancouver, *via* Hong Kong and Japan, to New York *via* San Francisco, and thence to England, Egypt, Sudan, Uganda, Kenya and back *via* Germany and Holland. The last stage of his trip covers Palestine, Iraq, India, Burmah and Siam.

Saving Time—and Money

A swift journey is, *ipso facto*, a luxurious journey if one concedes that travelling from place to place is monotonous. Air travel can, consequently, only be compared with first-class surface travel.

It is more than interesting to note that the fares on Hillman's Airways after June 6 will be, in two cases, less than those for surface travel and very little more in the other cases. Sums of 16s. 9d. and £2 5s. are saved on the single and return journey to Paris from London, while from Belfast to Paris the saving amounts to 7s. 3d. on the return fare.

The time saved, of course, is out of all proportion. Four hours fifty-five minutes, for instance, is saved between London and Paris, 16 hr. 55 min. between Belfast and Paris, and 15 hr. 45 min. between Belfast and Ostend.

Incidentally, the Hillman fleet will, when the new "Expresses" are delivered, consist of three D.H.86s, six "Rapides," three "Dragons," two "Fox Moths," one "Puss Moth," and one "Gipsy Moth."

Spanish Developments

There is no doubt that Spain has gone ahead rapidly during the last month as far as commercial aviation is concerned. The national company, Lineas Aereas Postales Españolas (L.A.P.E.), has extended its activities, not only in Spain and the islands which form part of the country, but also to France.

On May 16 the Barcelona-Palma de Mallorca (Balearics) line was officially opened. This service is a blessing to those who cannot put up with a ten-hour sea voyage, as the seaplanes cross over in little over an hour. Dornier "Wal" boats (two Napier "Lions") are employed on this run. The machine leaves Palma at 7 a.m. and arrives at Barcelona at 8.10 a.m. in time to connect with the machine to Madrid, Seville and Valencia, returning to Palma at 2.30 p.m. The Seville, Valencia and Madrid machine also connects with the outward service.

On May 18 a slight change was made in the Seville-Las Palmas (Canary Islands) service. The machine now leaves Barajas (Madrid). The scheduled time of departure is now at 5 a.m. from Madrid. This service runs once a week, leaving Madrid on Saturday and Las Palmas on Tuesday. Stops are made at Larache, Agdir and Cabo Juby, and there are optional landings at Seville and Casablanca.

On May 20 the Madrid-Paris line was opened under a pool agreement between the Lineas Aereas Postales Españolas and Air France. The Spanish company operates this line with two Douglas DC2s (two 710 h.p. Wright "Cyclones"). Machines leave Madrid at 7 a.m., reach Bordeaux at 10.15 and arrive at Paris at 12.50 p.m. The return machine leaves Paris at 1.30 p.m. Great benefits are to be derived from this line, as it is now possible to start from most European capitals in the morning and to reach Madrid in the afternoon of the same day.

It is the intention to extend the Spanish services to Lisbon and Marseilles in the near future.

From Kirkwall to Heston

On Monday Aberdeen Airways open their service between Edinburgh, Aberdeen, Wick, Thurso and Kirkwall, connecting in each direction with North Eastern Airways' service from Edinburgh to Newcastle, Leeds and London.

For New Zealand

New Zealand Airways, one of the newly formed operating companies, has ordered four of the old Boeing 40-B4 single-engined passenger and mail biplanes from the Boeing Company of Canada.

A New K.N.I.L.M. Extension

The K.N.I.L.M. have started a weekly trial service from Sourabaya to Denpasar (Bali) and to Macassar (Celebes). Starting at 6 a.m. from Sourabaya, the aeroplane lands in Denpasar at 8.5 a.m. Thirty minutes later the machine leaves this enchanted island, passing over the Java Sea, and reaching Maros, the landing ground of Macassar, at 12.50 p.m.

The Avro Freighter

The Avro 642, details of which were given in *Flight* of May 23, has now been delivered to Commercial Air Hire by Brian Allen Aviation, Ltd. In addition to the freight services already mentioned, the 642 will be used for services to Le Touquet during the summer. Mr. Coysh, incidentally, late of Banco, has joined Mr. Brian Allen, and several important developments are expected.

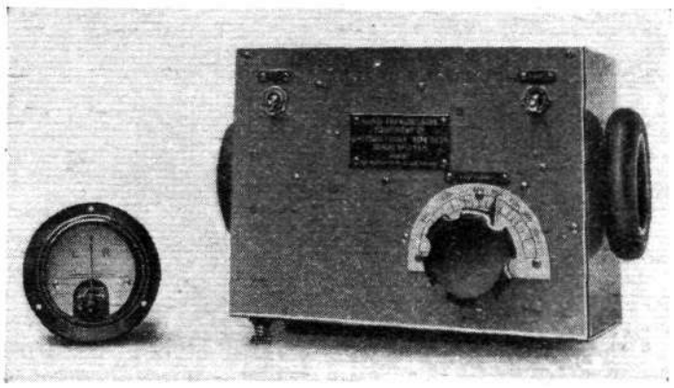
Probably the largest machine now in operation in this country—apart, of course, from those owned by Imperials—this machine is actually the *Marchioness of Londonderry*, previously owned by Mr. Sword, of Midland and Scottish Air Ferries.

A New Homing Device

In these days when the ground radio stations are so very busy, and when the narrow wave bands are so crowded, the uses of the homing device, or radio compass, are legion both for the private owner and for the charter pilot.

The latest example is that produced by Radio Transmission Equipment, Ltd., with a visual indicator rather similar to that of the standard turn indicator dial, and which will be described and tested in a later issue.

When "homing," the loop aerial is locked and the pilot keeps the indicator in the central position; when taking bearings, the machine is flown on a constant course while the loop is rotated until the needle is centralised, and the bearing is then read off on the loop scale. By the use of a direct visual indicator the disadvantages inherent in the continuous use of earphones are eliminated.



The R.C. 34A type of "homing" equipment to be produced by Radio Transmission Equipment.

A private owner will probably prefer the fixed streamline loop type of equipment with which he merely flies, with the help of the indicator, directly to any broadcasting or other radio station. Aural signals may be received through the earphones all the time. Changes of course from 2 to 5 degrees can easily be detected on the indicator when using any station.

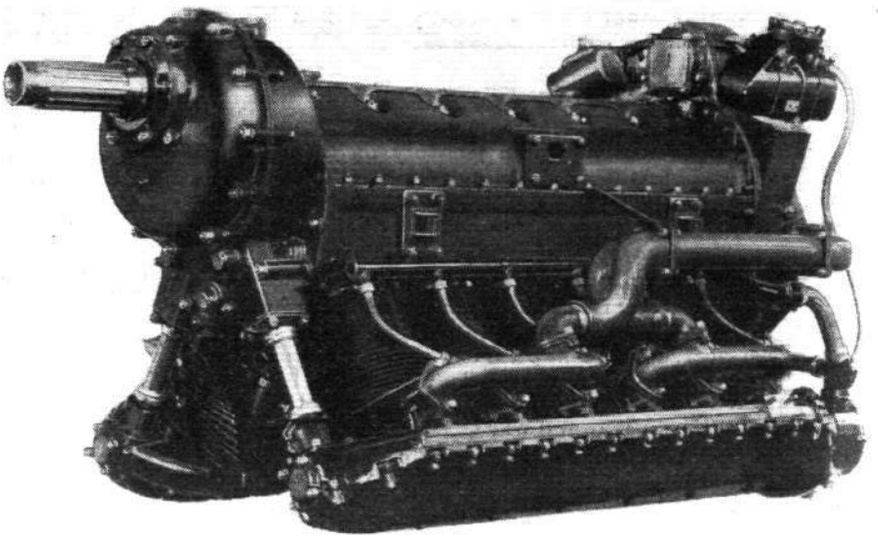
The homing device is provided in two forms, one the R.C.34A, is for use where the AC.44 transmitting and receiving equipment is carried, and the other, the R.C.34B, is primarily for use where this equipment is not carried, and weighs from 20 to 30 lb., varying with the aerial used and with its fitting. The R.C.34A weighs only 18 lb. with the rotatable loop.

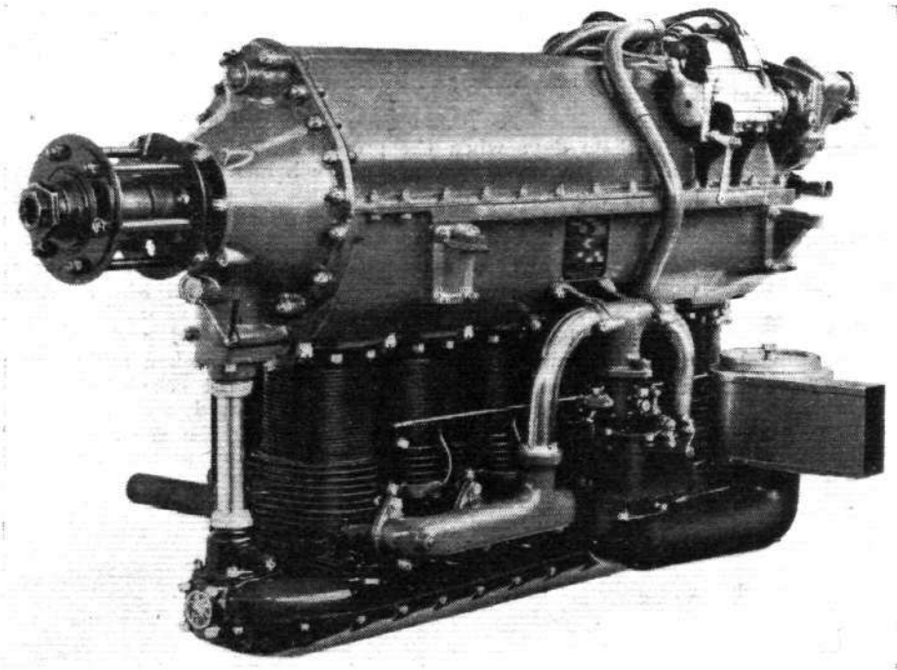
Incidentally, the additional time required to fly to a point in a side wind by simply "homing" rather than by allowing for drift is often exaggerated. Actually, the difference can be shown to be very small indeed.

AN AMBITIOUS ENGINE PROGRAMME

New Fairchild Range : 1,000 h.p. "vee" under Development : A "six" and a "vee twelve" Approved

AIRCRAFT manufactured by the Fairchild Company are certainly among the best produced in the United States, so the performance of the new inverted in-line air-cooled engines under development by the Ranger Engineering Corporation—a subsidiary of the Fairchild concern, situated at Farmingdale, Long Island, New York—will be watched with interest. Already the American Department of Commerce has approved two of these power plants—the 6-390-B inverted in-line "six," giving 145 h.p.; and a geared and supercharged inverted "vee" designated the V-770-SG and rated at 420 h.p. Other engines under development will have power ratings up to 1,000 h.p. and should prove interesting to the U.S. Navy, which favours air-cooled engines for carrier operation.





Above is seen the Fairchild "vee twelve" engine, rated at 420 h.p., and on the left is the six-in-line, which gives 145 h.p. Both engines have overhead, or, more accurately, "underhead" camshafts.

The following description applies to the Fairchild Ranger six- and twelve-cylinder engines.

A chrome nickel steel forging, machined all over, forms the six-throw seven-bearing crankshaft. The main bearing journals and crankpins are drilled for lightness and fitted with oil retainer plugs which act as centrifugal oil cleaners. Oil circulation through the shaft is so arranged that stoppage at one point will not affect the proper lubrication of all main and connecting-rod bearings.

The connecting rods are machined from chrome molybdenum steel forgings, and the aluminium alloy pistons have three compression and one scraper ring each.

Of semi-eliptical cross-section, the alloy crank case has upper and lower halves parted on the centre line of the crankshaft. The upper half carries two long studs at each of the seven main bearings which extend through the lower half and, acting as dowels, serve to clamp together the two halves, which are suitably ribbed for stiffness and strength.

Cylinders are of conventional type, their barrels being machined from extruded forgings of medium carbon steel, and provided with integral cooling fins and mounting flanges. The barrels are screwed and shrunk into the alloy heads, which have spherically machined combustion chambers and one inlet and one exhaust valve apiece.

The camshaft is what is termed by the makers an "underhead" type, and is completely enclosed by a cast aluminium housing, the cover of which serves as an engine oil sump. All accessories except the starter are driven from the airscrew end of the engine through a long, flexible shaft mounted in the crank case. They include an oil pump, fuel pump, generator, magnetos, and tachometer drives.

Two three-port cast manifolds connecting with a Stromberg carburetter by means of two steel elbows, and a hotspot at the side of the engine, between the centre cylinders, forms the induction system. Two Scintilla magnetos are provided, and air heaters and cleaners are optional equipment.

All important bearings are fed by oil under 60 lb. pressure. The entire engine is pressure lubricated, and there are separate pressure and scavenging oil pumps, the former being located in the rear of the crank case, and the latter, a double type, in the rear of the camshaft housing. There are no external pressure or scavenge oil lines in the engine, which is of very "clean" appearance.

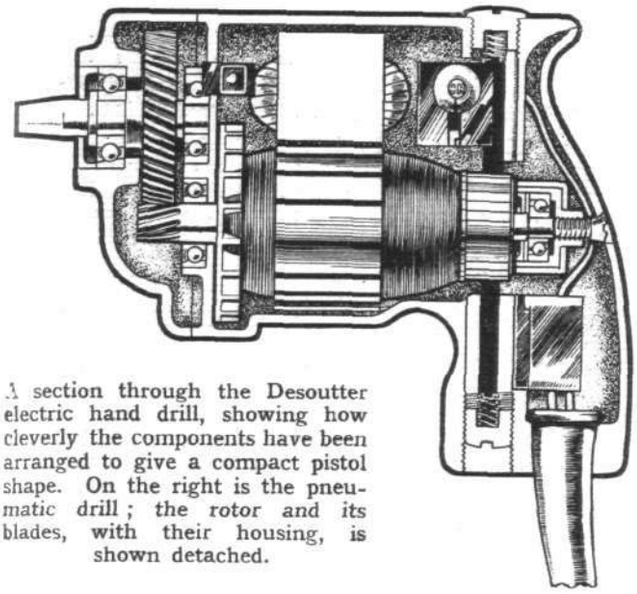
The supercharger, when fitted, is a vane type built into a redesigned crank case. Oil leakage into the supercharger is prevented by venting the drive shaft to atmospheric pressure, thus eliminating the necessity for packing. A single barrel Stromberg NAR-9 carburetter is mounted on the inlet side of the supercharger. Rated horse-power is given at sea level with a blower ratio of 8.25:1, but various other ratios can be supplied to give rated output at altitude.

Aviation on the Air

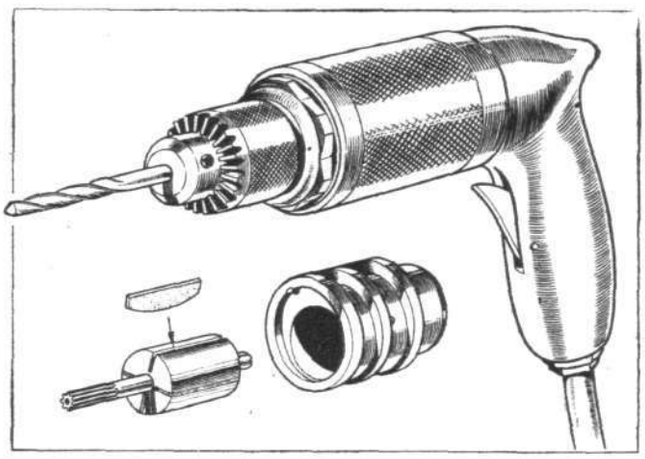
The third of the talks on civil aviation which are being broadcast in the Midland programme will be given on June 17, at 9 p.m., by Lord Willoughby de Broke. His subject will be "The Private Owner."

In the Scottish programme "Wings Over Clyde"—impressions of aviation in Scotland, arranged in co-operation with the Scottish Flying Club—will be broadcast next Saturday, June 8.

THE INDUSTRY



A section through the Desoutter electric hand drill, showing how cleverly the components have been arranged to give a compact pistol shape. On the right is the pneumatic drill; the rotor and its blades, with their housing, is shown detached.



SOME INGENIOUS DRILLS

BY eliminating, or putting to some account, nearly all the space which in more conventional electrical drill guns would be "waste," Desoutter Bros., Ltd., of The Hyde, London, N.W.9, have produced an electric drill which, for its power, is astoundingly compact and light. The makers claim, in fact, that although the tool weighs only about 2½ lb. it is capable of drilling a ¼ in. hole through a ¼ in. steel plate in five seconds.

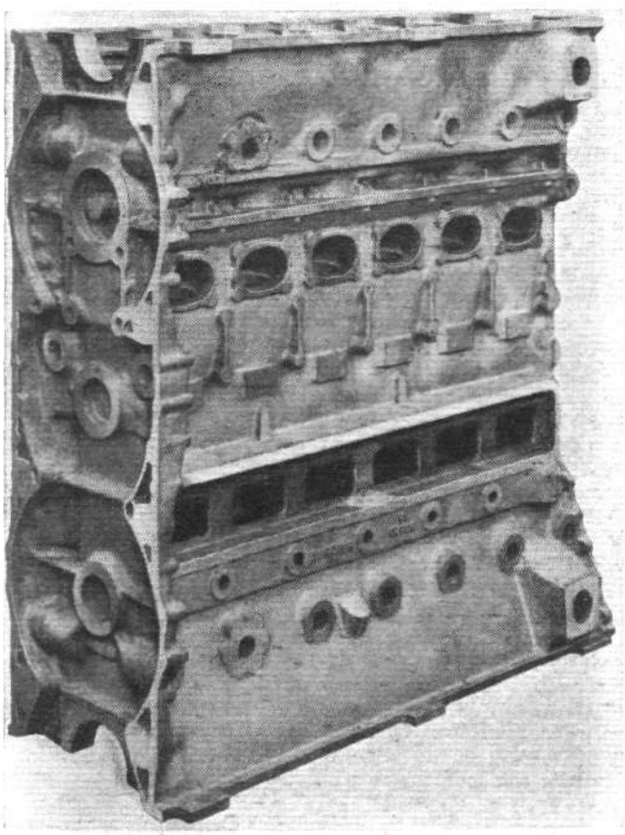
The chief beauty of the drill, which is operated by only one hand, lies, perhaps, in the electric motor. There is only one field coil, this being above the armature, and the lower carbon brush is housed within the handle. This arrangement allows the body of the drill to approach a true pistol shape. A notable feature of the armature windings is that they are former wound; they are taped with silk and inserted into slots in the armature. The tool is driven through helical gears running on ball bearings.

Spring contacts form the electrical connections, and are automatically positioned during assembly. The extraction of two screws allows the tool to be taken completely in halves. A switch is provided just above the portion normally covered by the thumb, and spare brushes are contained in a transverse holder. Efficient cooling is secured by the use of a centrifugal fan which draws air past the armature.

Two models of the tool are available, of $\frac{3}{16}$ in. and ¼ in. capacity. Both are suitable for alternating or direct current; the former runs at 2,500 r.p.m., while the ¼ in. model, which is provided with an extra train of helical gears, has its speed reduced to 1,500 r.p.m. and weighs 2¾ lb. against the 2½ lb. of the smaller model.

In addition to the electric drill, the company is producing a highly interesting model known as the "Rotor" air drill which should find no lack of employment in an aircraft factory. This model weighs the same as the ¼ in. type electric drill, but employs a rotor driven by compressed air. The rotor, the spindle of which is eccentrically mounted in its casing, contains vanes lying in slots. They are pulled from these slots by centrifugal force, and revolve under an air pressure of 80 to 100 lb. per sq. in. The "free" speed of this type is 2,100 r.p.m. and the air consumption 11 cu. ft. per minute. A trigger forward of the handle gives a graduated control of speed. The chuck spindle is driven through roller bearing epicyclic reduction gearing; the capacity is $\frac{5}{16}$ in. in the standard model, but a $\frac{3}{8}$ in. rotor drill will soon become available.

A similar type of rotor is also embodied in a grinder, which runs at 18,000 to 20,000 r.p.m. Another ingenious tool which seems to be well suited to manufacturers of wooden aircraft is a router running at from 50,000 to 55,000 r.p.m.; driven by compressed air, this utilises a turbine. Other Desoutter products which already are of interest to aeroplane constructors are pneumatic screwdrivers, drills and spanners.



A WORK OF ART. This remarkable casting, in Hiduminium R.R.50, will be recognised as the cylinder and crank case block of the 720 h.p. Napier "Culverin" compression ignition engine, which has a crankshaft above and below the six cylinders, in each of which two pistons work in opposition. The casting, which is the work of the Birmingham Aluminium Casting (1903) Co., Ltd., weighs 525 lb. and the average thickness of $\frac{7}{32}$ in. is maintained to within + or − $\frac{1}{64}$ in.

A NAPIER APPOINTMENT

His many friends will be glad to learn that Mr. W. P. Savage has been appointed sales and service manager of Napiers.

FOR WHEEL BEARINGS

Their ability to carry any combination of heavy thrust and radial loads is claimed as one of the most useful characteristics of a new series of taper roller bearings developed by British Timken, Ltd., for aircraft landing wheels and tail wheels.

ADVICE TO PATENTEES

Much practical and authoritative advice to those contemplating the patenting of inventions is contained in "Practical Hints on Patents" (fourth and revised edition). This 48-page booklet is by M. E. J. Gheury de Bray, and is published at 1s. by the Imperial Patent Service, First Avenue House, High Holborn, London, W.C.1.

The Industry (contd.)

SEA AND AIR

When the National Benzole Company's new coastal tanker, the *M.V. Ben Oliver*, was launched at Colchester recently Mr. J. Scoles circled overhead in the company's aeroplane.

HYDRAULIC FLAP OPERATION

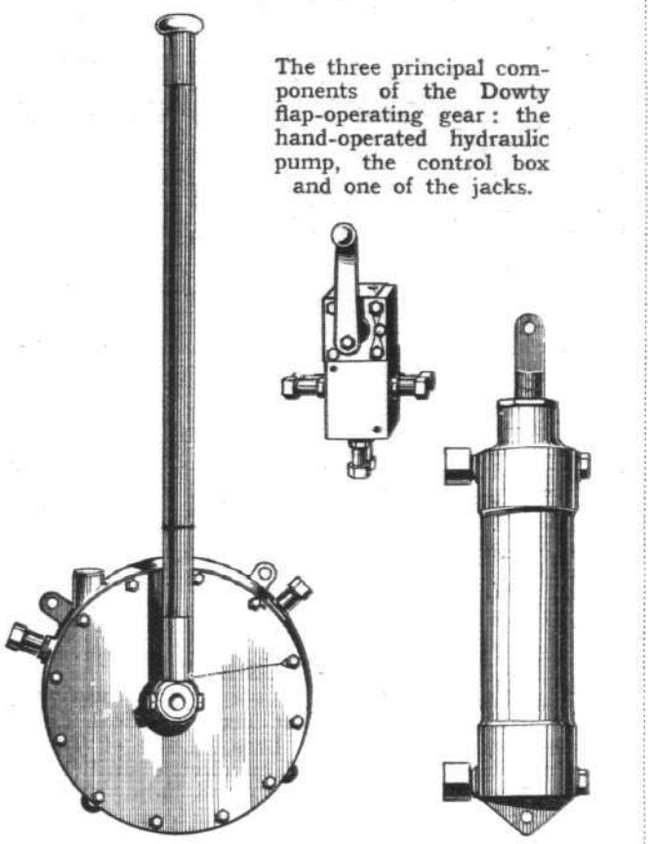
AT least twenty different types of aeroplane in this country and on the Continent are employing the Dowty flap-operating equipment. This utilises an hydraulic system consisting essentially of a pump, control valve, and jacks.

The standard hydraulic pump, which also forms a reservoir, is mounted in the cockpit and operated by hand. It is possible to adjust the length of the handle to suit the needs of different machines. The body consists of Elektron castings, and the complete pump unit weighs 3½lb.

In the control box the direction of the flow of oil for raising or lowering the flaps is changed; this unit is also provided with a release valve for limiting the maximum flap load. At any predetermined load the relief valve will open by passing the oil to the reservoir so that the flap folds into the wing. In the event of a pipe line fracturing, the jack concerned is automatically locked in position: the flap, therefore, is held with perfect rigidity, but it is possible by operating through the remaining pipe to complete the operation if desired.

A typical jack would be of one-piece duralumin construction, with moving parts chromium-plated to lessen friction and to protect the surface against corrosion. In the case of flaps where the load is progressive during lowering it is possible to connect the jacks on both sides of the aeroplane to a common power supply. When the flaps are balanced, or are of such construction that the load on a flap "changes sign" during operation it is necessary to provide a system which ensures equal distribution of oil to each jack. In this case a special control unit is provided.

The weight of a complete set of flap-control gear for a machine of 9,000lb. weight is approximately 10lb.



The three principal components of the Dowty flap-operating gear: the hand-operated hydraulic pump, the control box and one of the jacks.

AIR POST STAMPS

By DOUGLAS ARMSTRONG

Air Train Stamps

THE latest development in aerial navigation, the glider train, is associated with the overprinting of a small supply of contemporary Cuban air mail stamps (of the international series) with the three-line inscription "PRIMER TREN AEREO INTERNACIONAL 1935—O'Meara y du Pont x 10 cts."

These stamps were used to defray postage upon a special mail despatched on May 5 from Havana to Miami by an air train composed of an aeroplane with two gliders in tow, the surtax of 10 centavos being a contribution toward the cost of the experiment. The overprinted stamps were put on sale nine days earlier—on April 26—and were immediately the objects of wild speculation, stamp dealers and others queuing up at the post office to obtain their supplies, which were promptly put up to a premium of thirty-three and one-third per cent.

There are two varieties of this novel air mail stamp, the ordinary perforated 10-centavos stamp of which 25,000 copies were so treated for the occasion and a further 10,000 issued imperforate.

Amelia Earhart Stamp

Another air stamp novelty hails from Central America, in the form of a special issue dedicated to the United States aviatrix, Miss Amelia Earhart, by the Mexican Government in recognition of her recent goodwill flight from New York to Mexico City and back. It takes the form of the present 20-centavos Mexican air mail stamp bearing an additional overprint in violet ink which reads: "AMELIA EARHART—VUELO DE BUENA VOLUNTAD—MEXICO 1935." Out of a total of 780 copies which received this imprint 480 were forwarded to the Berne Bureau of the Universal Postal Union for purposes of record and about 100 affixed to letters carried on the return non-stop flight to New York, leaving only 200 unused specimens available to air-mail collectors. It is further stated that the majority of these were cornered by an American on the spot, with the result that they are now quoted on the New York stamp mart at $175 apiece.

Dominica's Latest

A highly original and effective design graces the new 10-centavos air mail stamp of the West Indian republic of Santo Domingo, better known as the Dominican Republic; the stamp made its début on April 29 last. In traverse rectangular format it presents a composite and impressionist picture of a bird superimposed upon an aeroplane against a background formed by a shadowy picture of a giant monoplane. The words "Correo Aereo" appearing in the upper right-hand corner denote the particular character of the stamp, which is printed in contrasting shades of light and dark blue.

New Canadian Air Stamp

Included in a complete new series of postage stamps that has just been taken into use by the Canadian post office is a 6 cents denomination reserved exclusively for the air mail service printed in brown-lake with a classical picture of Daedalus, the father of Icarus, soaring on waxen wings above the Aegean Sea.

More Sudanese Aeros

The theory advanced in this column last month that the Anglo-Egyptian Sudan might shortly abandon the issuance of distinctive stamps for air-borne correspondence was apparently unfounded. On the contrary, it transpires that when supplies of the recent provisional surcharges are exhausted they will give place to air stamps of equivalent face value but in the permanent design. Ten thousand copies each were provided of the 7½ and 10 piastres surcharges on the obsolete 4½ pi.

S.C.A.D.T.A. Remainders Destroyed

Collectors of the ever-popular Columbian air mail stamps issued under the auspices of the S.C.A.D.T.A. concern may be interested to learn that a considerable "remainder" stock that has lain in the company's vaults ever since the air mail service became a Government monopoly was officially destroyed early in the present year, with the exception of some thirty sets retained for reference.

The Air Mail Society

Another highly successful meeting was held on May 22, the President, Dowager Viscountess Downe, being in the chair. A most interesting account of the first aerial posts carried out experimentally at Allahabad (India), and later between London and Windsor, in connection with the King's Coronation in 1911 was given by Commander Sir Walter Windham, Kt., R.N., who organised them.

During the evening it was announced that Lord Wakefield of Hythe had accepted office as a vice-president of the Air Mail Society.

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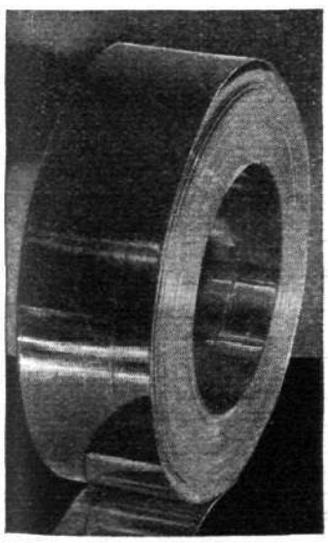

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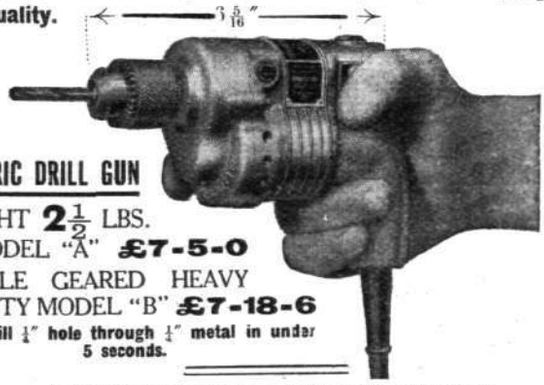

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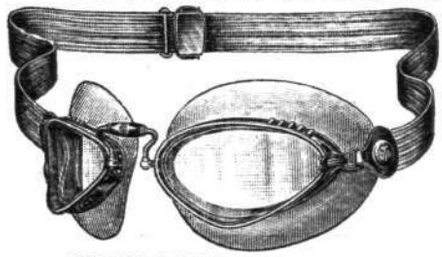

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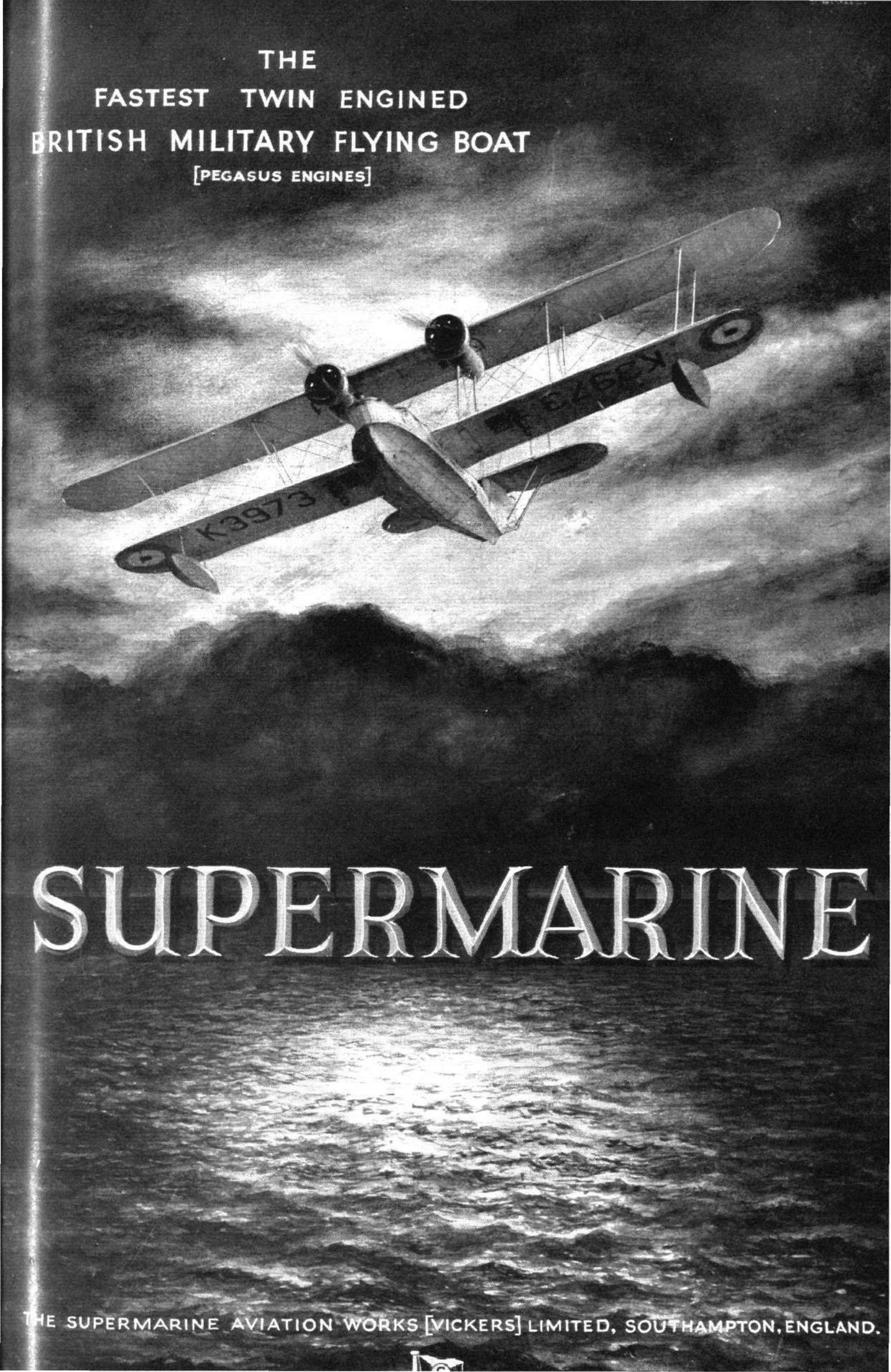

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